



# Psilocybin Mushrooms Cultivation

How to Grow  
Gourmet Mushrooms  
at Home

Henry J. Powel



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# **Psilocybin Mushrooms**

## **Cultivation:**

*How to Grow Gourmet and Medicinal  
Mushrooms at Home.  
Safe Use, Effects and FAQ from users of  
Magic Mushrooms*

*By Henry J. Powel*

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# Introduction

Mushrooms have a wide variety of uses – apart from being used for their therapeutic properties, mushrooms are also useful in the kitchen for the preparation of various types of healthy meals.

One peculiar thing about mushrooms is that despite we already know about 20,000 different varieties, more and more varieties are being discovered every other day. These new varieties also have culinary and therapeutic uses.

Most people take mushrooms for their medicinal purposes because they contain generous amounts of B-vitamins such as biotin, niacin and riboflavin, which are very useful to the body. Mushrooms are also good sources of folic acid.

Others consume mushroom just for the taste it adds to dishes. Yes, mushrooms can be used in the preparation of various types of dishes, including sandwiches, salads, and pasta.

If you love mushrooms, either for their therapeutic or culinary benefits, one challenge you will often face would be to find it in large quantity.

Even though many grocery stores or markets have a section with a good amount of mushrooms for sale, you will often find it difficult to source for all the varieties you need.

Just like other food items, one variety of mushroom will not always serve all purposes. So, you will need to use various kinds of mushrooms to benefit from their taste and medicinal properties.

Since you will not always find all the mushrooms you want in the grocery store, a good option for you would be to grow your own mushrooms.

This way, you can always walk to your garden and harvest as many mushrooms as you want and prepare your meals without stress.

Also, cultivating your own mushrooms means you will always have the varieties you want at a cheaper cost!

Even though mushrooms are not plants nor animals – they are often classified as fungi; you can grow them the same way you grow plants.

The major difference between mushrooms and plants is that, while the latter contain chlorophyll and obtain their nutrition from the sun through photosynthesis, the former does not contain chlorophyll and only obtain their nutrition from the decomposition of non-organic matter.

Since we have seen that mushrooms can be cultivated, we shall be looking at the various ways of doing so, which are provided in this guide. This is a step-by-step guide that will take you by the hand and show you the various ways of growing your own mushrooms at home.

The steps and techniques described in this guide are quite simple so that you can easily follow them. We have also tried as much as possible to reduce the use of technical jargon that would confuse you.

Substantially, what we have done is to show you the different varieties you can cultivate and how you can save yourself a lot of money doing so. If you have been thinking of the right way of sourcing for mushrooms, think no more, as you will soon learn how to grow your own.

Before we get started, it is important to state that growing mushrooms is not that difficult – you don't need a large garden in your backyard nor a lot

of technical knowledge to do so.

The same way you can grow your favorite herbs and greens using pots can be used to grow mushrooms without taking up a lot of space.

Without further ado, let's dive in and start exploring the various ways of growing mushrooms at home!

# Chapter One: Basics for beginners

Since this is not a science textbook, and considering the fact that you only want to learn how to grow mushrooms, we will only be considering a simple definition of mushrooms.

If you would like to learn more about mushrooms and their scientific nature as well as their cell composition, then you might consider getting a book that describes that in detail.

That being said, mushrooms are neither plants nor animals – this is something that most people find surprising. Many people often think that mushrooms are plants, probably because they grow from dead plants.

Some others even think mushrooms are animals – well, why anyone would think so is beyond my understanding. Perhaps, it is due to the fact that some mushrooms have juicy meaty upper parts that taste like meat when seasoned with the right ingredients.

Since mushrooms are not plants or animals, scientists have catalogued them as lower plants. They are classified as fungi largely due to their anatomically uncomplicated nature.

Having anatomically uncomplicated nature means that mushrooms don't have leaves or actual seeds, flowers, stems, and roots.

Generally, mushrooms have cell walls that are different from plants, and that's why they are not classified as plants.

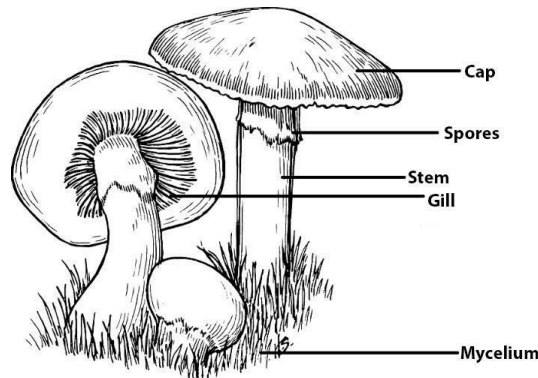
## Various parts of a mushroom

The mushroom has various parts which we will be referring to in this guide – so, it is important for us to look at these, which include the following:

- The cap
- Gill
- Ring
- Stem
- Spores
- Volva
- Hypha
- Mycelium

Note: some of these names are the same as the ones of a plant or tree. However, keep in mind - as we have mentioned earlier - that the mushroom is not a plant.

Let's proceed to look at what each part does.



### 1. Cap

Just as the name implies, the cap is the topmost part of the mushroom. It is like the crown that is worn by almost all varieties of mushrooms. Mushroom caps usually come in various colors, sizes, and shapes.

The major job of the cap, as you should already guess, is to protect the gills, stem, and other bottom parts of the mushroom. In some varieties of mushrooms, the cap has the resemblance of a headdress, hence the name.

### 2. Stem

Even though this is not a real stem as it does not have the typical parts of the normal stem of a tree (xylem, cambium, epidermis, phloem, bark, pith, etc.), it still does the job of a stem, which is typically to support the cap and the upper elements of the mushroom. Most mushrooms have different stem colors.

### 3. Spores

The spores of a mushroom are like their reproductive organs. They are like

the pollen grains of a flower that gets released into the air to pollinate the flower of another tree.

The spores of a mushroom look grainy and smooth as well. When they are released or blown into the air and land on a substrate, the reproduction of a new mushroom occurs.

Different varieties of mushrooms have different colors of spores.

#### **4. Gill**

The mushroom's gill looks like the gills of a fish – and its major function is the production of spores. So, the spores that appear at the base of the mushroom are produced by the gills.

#### **5. Mycelium**

This is like the roots of mushrooms – it is from this part that the entire mushroom, including the stem and cap, grow out from. When the spore of a mushroom germinates, the first part that is produced is the mycelium.

The mycelium often appears to be entangled, just like the roots of a real plant. Then, from the mycelium, the other parts of the mushroom will grow out.

#### **6. Hypha**

The hypha is also part of the mycelium – they are mostly microscopic filaments that help to draw nutrients and water from the ground for the growth of the mushroom. The hypha is mostly white in color, but some varieties of mushrooms also have hypha that comes in various shades of gray.

#### **7. Volva**

The volva is like a protective covering for the mycelium and the other delicate bottom parts of the mushroom. When a mushroom is just germinating, the volva serves as a protective membrane. As the mushroom continues to grow, the membrane will rupture, allowing the upper parts of the mushroom, such as the cap, stem, and gill to shoot out.

#### **8. Ring**

The ring is a remnant of the protective membrane that protected the young

mushroom when it germinated. The ring covers the gill and cap of the mushroom when the plant is just germinating.

After germination, the remnant of the protective membrane forms a “ring” around the stem of the mushroom just below the gills.

Now, we have seen the various parts of a mushroom; let’s look at the various reasons why someone would want to cultivate or grow mushrooms.

## **Why grow mushrooms?**

People do things for various reasons – anyone who is logical will often ask, “What’s in it for me?” before diving into any venture. On that note, we want to look at the various reasons why growing mushrooms is a worthy adventure.

Even if you don’t eat mushrooms, you might still consider growing them for the sole purpose of understanding their simple, yet complex nature.

Watching a mushroom shoot out from the mycelium and grow into a mushroom can be both fascinating and intriguing. It is an experience that you would want to have as it is quite fulfilling. So, mushroom growing or cultivating is not something that is reserved for only those that eat them.

While it is a known fact that mushrooms can be used for food and for their medicinal benefits, only a few people know that these amazing low-level creatures can also be used to make paper, hats, dyes, fabric, and paint. Some varieties of mushrooms even glow in the dark – so they can be used to lit up that dark corner of your house.

As you can see, you don't need to be someone that consumes mushrooms to grow them. Eating mushrooms is just one out of the many other things you can do with it.

Remember, mushrooms are classified as fungi – and some varieties are renowned for the production of citric acid, penicillin, and birth control pills. Are you surprised? Don't be – there are still more interesting facts about mushrooms that would make you want to grow them.

Just to stimulate your curiosity, let me introduce one of the most amazing mushrooms you'll ever encounter: The zombie mushroom. The zombie mushroom is enthralling for many reasons – it can take over the brain of an insect, manipulate the insect to climb to the highest part of a tree, and force the insect to colonize it.

The insect would help spread the spores of the mushroom, thus helping it to fertilize and grow new mushrooms.

## **Mushroom for fun**

Apart from growing mushrooms for food, many other reasons abound as for the reason why people grow or even hunt mushrooms. Some people are just fascinated with mushrooms and can go as far as growing them just for fun. So, even if you do not eat mushrooms, you can join the teeming number of people who grow it for fun.

Apart from growing the fungi, you can also join hundreds of other hobbyists who go into the wild to look for mushrooms, an activity often referred to as “foray.”

Just for the same reason why some people go birding, many others go foraging – it is always for the fun of it.

As said earlier, even if you don't want to grow mushrooms for food, you could consider growing it for fun. This can be a great way for you to network or connect with other like-minded people.

As a mushroom enthusiast, you can always meet other enthusiasts and try to identify mushrooms in your garden or even in the wild. You and fellow

hobbyists can often take turns visiting each other's mushroom garden, just to pass the time.

In many countries, there are mushroom clubs that you can join – in the United States, many states have mushroom clubs that are open to new members.

As someone who grows mushrooms for fun, you can join such clubs and participate in group activities involving identifying and analyzing the best ways to grow mushrooms.

### **You can grow mushrooms for the health benefits**

Even though most people know mushrooms for their culinary uses, mushrooms also have medicinal benefits or uses. For many years, scientists have been studying the health benefits of mushrooms. What's even more interesting is the fact that various species or varieties of mushrooms have their own health benefits. So, as the years unfold, scientists continue to discover new medicinal benefits of mushrooms.

Some of the most common mushrooms such as Lion's Mane, Maitake, Shiitake, etc. that are most commonly grown by home farmers are well known for their abilities in fighting various health issues. One particular variety of mushroom that is of interest here is the one called the "Mushroom of Immortality." The official name of this mushroom is "Reishi," and it often grows in the wild in most places in the world.

See the image below.



For thousands of years, the Chinese have been using the mushroom of immortality for its medicinal benefits. Reishi is not only used in oriental medicine, but people in western countries have also often used the mushroom for its health benefits as well.

One characteristic health benefit of Reishi is that it helps to boost the

immune system. The immune system plays a key role in the human body. It is like our body's defense system that protects us from external invaders such as illnesses and infections. So, as expected, anything that boosts the immune system will help you live a healthier, stronger and longer life.

In addition to boosting the immune system, the mushroom of immortality also helps with blood pressure, stress, cholesterol, and regulation of blood sugar levels.

Interestingly, the mushroom of immortality can be grown at home – either indoors or outdoors. So, get ready to enjoy its power of immortality!

### **Mushrooms can be grown for their hallucinogenic properties**

Hallucinogens are substances that alter an individual's perceptions or awareness of their surroundings. Interestingly, some mushrooms have hallucinogenic properties and can be grown solely for this purpose.

In fact, we cannot discuss growing mushrooms without mentioning their hallucinogenic properties.

Even though, in many countries, it's illegal to grow mushrooms with hallucinogenic properties, there are still some places where it is allowed. So, you will need to make sure that it is allowed in your country and local state before proceeding.

Psilocybin is one of the active substances in hallucinogenic mushrooms – when you eat mushrooms that contain this naturally occurring psychedelic compound, you will see yourself the hallucinating effects of it. There are currently over 200 identified varieties of mushrooms that contain psilocybin.

In this book, we shall be concentrating on mushroom species or varieties that do not contain active compounds. These types of mushrooms are for food or fun – however, if you would want to grow hallucinogenic

mushrooms, you can still apply the same techniques you will learn in this book. Before doing that, again, make sure it is legal to grow such mushrooms in your state or country.

## **You can grow mushrooms as a business**

Apart from growing mushrooms for your personal use, you can also grow them as a business. Yes, you will always have people patronizing you for obvious reasons.

One of the reasons why mushroom growers have no problems in maintaining their business is the recent continued emphasis on environmental sustainability, which constantly makes people look for different ways of preserving our environment.

As you may know, growing animals for consumption is one of the many elements that contributes to the degradation of our environment. So, people who are keen on sustainability are looking for alternative sources of food – away from plant and animal sources. Apart from plants and animals, mushrooms are the next closest alternatives.

Beside sustainability enthusiasts, people who desire a healthier lifestyle also find mushrooms to be better alternatives than the many other options available on the market. Most food items you find in grocery stores today contain a lot of chemical components, either used for packaging or preservation. So, mushrooms are more organic than the many other food options you may find, and people who care for organic food will often go for mushrooms.

What do all of this mean? You can expand your indoor mushroom garden into a thriving business. You will always be in business because

mushrooms have a short life span – so grocery stores will always be at your door for supplies.

Even though the techniques we will describe in this book are for small scale mushroom cultivation, you can replicate them in large scale when you want to go commercial. You just need to expand on the knowledge, increase your mediums or substrates, and grow into a huge mushroom farm.

Now that we have seen the various reasons why you should continue with your dream of growing mushrooms at home; let's proceed to look at the cultivation process.

### **Words to note**

There are a few words you will come across often in this book. It is important that we define some of them.

**1. Substrate** – a substrate as used in mushroom cultivation simply means a medium that mushroom grows on. The most common substrate for mushroom cultivation is wood. You can also use toilet paper rolls as a substrate.

**2. Decomposition** – while plants obtain their food through photosynthesis, mushrooms get their nutrients through a process known as decomposition. In decomposition, the mycelium of a mushroom decomposes a substrate that releases nutrients in the process. The released nutrients are absorbed by the mushroom for growth.

**3. Colonization** – when the spores of a mushroom come in contact with a substrate that has the right conditions, the spores grow into mycelium. The mycelium quickly grows in as many areas on the substrate as possible. This process is called colonization.

**4. Spawn** – a mushroom spawn is simply a mycelial mass which has been grown out to be transferred to another substrate. When you transfer spawn to another substrate, you allow the mycelium to colonize the new

substrate, thus increasing the number of mushrooms you are going to have from the original mycelial mass.

Spawn substrate – a substrate used to grow mushroom spawn

**5. Fruiting** – when a mushroom’s mycelium starts pinning or bringing forth the first set of actual mushrooms from the mycelium, the mushroom is said to be fruiting.

**6. Fruiting substrate** – a special substrate that has been prepared to make it easy for mushrooms to fruit on them.

## **Primary and secondary decomposers**

Mushrooms are mainly grown for food – which is the area we will be concentrating on in this book. Apart from that, mushrooms also have a lot of other uses. As someone that wants to grow mushrooms, you shouldn’t limit yourself to just growing it for food. You should consider exploring other uses of the mushroom, so you will have a balanced view.

At the mention of mushrooms, the two varieties that often come to people’s minds are the White Buttons and brown Portabellas. These are probably the two most popular varieties that you would often find in grocery stores, and they belong to the *Agaricus* species. They are also the ones that are more commonly used for veggie burgers and salads.

It is important to state that growing the brown Portabellas or White Buttons on a small scale is a bit hard because there are already a lot of people who are into mechanized, large scale production of these varieties of mushrooms.

Since their production is highly mechanized, the prices of these varieties are also low – hence, a small scale farmer may find it hard to match such low prices.

To grow mushrooms that belong to the *Agaricus* species, you will need to use a manure-based substrate, and you will get this substrate composted

first, then treated with vaccines before being used to grow mushrooms.

This process can take several months or weeks. After the composting and inoculation process, the spores that grow into the mushroom are introduced to the substrate, and a new mushroom is what you get.

Brown portabellas and white buttons that belong to the *Agaricus* species are commonly known as secondary decomposers. The reason for this is that they pass through two separate stages of the decomposition process before they are finally ready to bear fruits and get harvested.

Because of the huge amount of time that it takes to compost substrate and the long inoculation process, which also takes time, the White Button and other mushrooms in the *Agaricus* species are not of interest to small home growers of mushrooms.

As a home grower or a hobbyist, you will be growing more of the types of mushrooms referred to as primary decomposers. Just as their names imply, primary decomposers are the first substances or organisms that initiate the decomposition of the substrate or substance that they would grow on.

For instance, if you are using wood as the substrate, primary decomposers would be the first elements to decompose the wood. In most cases, substrates used in growing primary decomposers are wood-based mediums.

Primary decomposers are different from secondary decomposers because, to grow the latter, you would need to compost the substrate first, then vaccinate before introducing the spores. To grow the former instead, you wouldn't need to compost first, as the first decomposers are usually the first organisms that begin the process of cellular decomposition of the wood or substrate used.



At this point, you should already know that mushrooms that fall into the primary decomposers group are easier to grow because preparing the substrate or medium needed for their growth doesn't take much time.

Some of the common mushrooms that fall into the primary decomposers group include Oyster and Shiitake. These types of mushrooms decompose or break down their substrate in order to grow. Such mushrooms that break down their substrate or medium to grow are commonly known as saprophytes.

Saprophytes are organisms that can easily break down organic matter such as lignin and cellulose, which are usually found in dead plants and wood. The organic matter thus decomposed releases some energy which the saprophyte utilizes to start a new biological process or life.

In other words, when saprophytes come in contact with some materials such as wood or other plants, they decompose the material, thus releasing energy which the saprophyte uses in starting a new life or biological process.

Some of the most common mediums or substrates for the growth of primary decomposers or saprophytic mushrooms include straw, woodchips, sawdust, and other plant materials.

While many of the mushrooms we consume can be grown, either as primary or secondary decomposers, some of them cannot be grown by man. For instance, Chanterelles and Morels are some of the popular mushrooms that cannot be grown. They only grow in the wild, and people go out in search of them.



The image above shows smooth chanterelles, a popular edible mushroom, which cannot be grown by humans.

Chanterelles and the other types of mushrooms that cannot be grown do not fall into the primary or secondary decomposers category. Rather, they fall into the group known as mycorrhizal fungi.

Myco simply means fungi, while rhiza means roots. As stated earlier, they are neither primary nor secondary decomposers – they are basically fungi with roots.

So, how do they grow? Their roots help the mushrooms draw their nutrients from plants – they have a kind of symbiotic relationship with

plants. In symbiotic relationships, the two parties help each other mutually. In the symbiotic relationship between mycorrhizal fungi and the tree, the fungi help the tree by expanding the surface area that the roots of the tree can cover.

This helps the tree to reach more areas in the soil or ground for water and nutrients that were previously inaccessible to the tree. In exchange, the host tree provides the mushroom or fungi with nutrients that come in the form of carbon or sugar.

These nutrients that the tree provides to the mushroom are usually generated through photosynthesis. In the simplest of terms, photosynthesis is the process by which green plants use sunlight to generate their own energy, nutrients, or food.

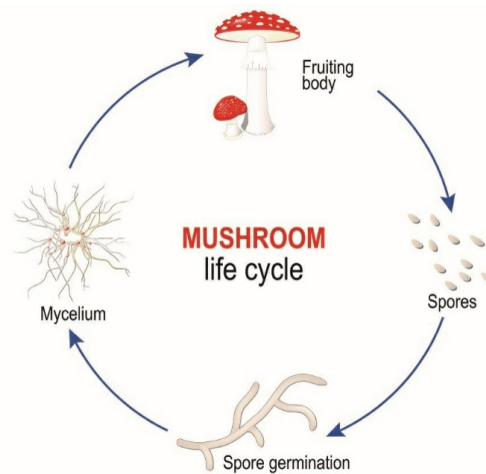
Most plants - more than 90% - usually form symbiotic relationships with mycorrhizal fungi – this explains why smooth chanterelles are some of the most common edible mushrooms that you can find in grocery stores.

Humans have not learned how to replicate the type of complex biological interaction that happens between mycorrhizal fungi and trees, and this explains why we are still unable to grow some of the most popular types of mushrooms today.

## **The cultivation process**

Every mushroom, no matter the species or variety, goes through almost the same life cycle or cultivation process. This means that no matter the type of mushrooms you want to grow, you will still follow the same process to do it.

The image below shows the life cycle of a mushroom.



### **First stage: spore germination**

The first stage in the life cycle of a mushroom is the spore germination. Remember, we mentioned earlier that the spores of the mushroom are like the pistil that get fertilized to form a new plant.

Unlike in plants where the pollen grains of two flowers have to meet for germination to occur, in mushrooms, the spores have to come in contact with a medium or substrate with the right mix of nutrients, temperature, and moisture. Once these conditions are in the right order, the spores will germinate, and new mushrooms will start to grow.

### **Mycelium growth**

After the spores have germinated, the next stage is the mycelium growth. Remember, the mycelium of the mushroom is like the roots of a plant.

Now, when growing mushrooms, you have to ensure you have enough mycelial mass – the more mycelium, the better. It is just like what you would do if you want to grow peppers in your backyard. If many of the peppers germinate from the seeds and you make sure that nothing disturbs the young shoot, you would have many pepper plants.

As the mycelium is growing or shooting out, it tries to colonize as many materials that come its way as possible. The mycelium tries to decompose the substrate or medium that it is growing on – it contains special enzymes that are responsible for this.

When the mycelium decomposes the substrate, medium, or material that it is growing on, nutrients are released as a result of this decomposition. The released nutrients are absorbed by the mycelium to aid the growth of the stem of the mushroom.

One interesting fact about the mycelium of the mushroom is that they are

very selfish – as long as there are still available spaces on the medium that the mycelium is growing on, the mycelial network will continue to widen. This is something that the mycelium does in a bid to reach potential nutrient sources.

The mycelium will only stop growing when there is no more available nutrient source which it can colonize or if there is another organism that is compete with the mycelium for nutrients. Also, if there is a contaminant in the culture, substrate, or medium, the mycelium will stop growing.

For mushroom cultivation, some of the most common substrates or mediums used for the growing of mycelium include brown rice flour, sawdust and logs of wood. Some people also use grain-based substrates, which are placed in canning jars, especially during the vegetative stage of the mushroom. You can also use hydrated rye grain in quart canning jars. Before using any substrate, the substrate must be sterilized in a pressure pot or boiled in hot water – this is necessary to remove contaminants that might impede the expansion of the mycelial network of the mushroom.

## **Increasing the mycelium**

Earlier, we stated that the bigger the mycelial network you get when the mycelium is still growing out, the bigger will be the number of grown mushrooms you will have. So, during the mycelium growth stage, you will have to ensure you take proactive measures in increasing the mycelial network.

One way to do this is to keep transferring progressively your mycelial mass to larger colonization vessels. This is how it works: once the mycelium starts growing, remove some of the mass from the initial colonization vessel and place them on another vessel.

The new mass placed in the second vessel will now try to colonize as many parts of the substrate as possible, thus increasing the volume of the mycelial mass you will get at the end of the experiment. You can repeat this process by introducing some of the mycelial mass to as many colonization vessels as possible. Allow all the mycelial mass in the different colonization vessels to colonize all the substrate before you finally transfer all of them to a fruiting medium.

## **Transferring mycelium to the fruiting substrate**

For the mycelium that you have grown to become full-grown mushrooms,

you have to transfer the mycelial mass to a fruiting substrate.

As a beginner who is only interested in growing mushrooms in small quantities, you may totally ignore this step and allow the mushrooms to fruit in the same substrate used for the mycelium growth.

This will help you to reduce contamination that might occur as a result of transferring the mycelium from one substrate to another.

However, for large scale cultivation of most edible mushrooms such as Maitake and Shiitake, you will need to transfer the grown mycelium to a fruiting substrate, usually wood-based. Often, the wood-based fruiting substrate is made of sawdust that has been supplemented with wheat bran.

For other species of mushrooms such as the Oyster mushrooms, the most common fruiting substrate is straw. Once the mycelium mass has been transferred to the right fruiting substrate, they grow into full mushrooms. The next stage in the life cycle is the fruiting phase.

## **The fruiting phase**

The fruiting phase is the stage in the life cycle when the actual mushrooms begin to form from the mycelium. Once you have successfully colonized the right volume of mycelial mass you need – next, you will have to prepare the fruiting substrate to ensure you have the right environment for the mycelium to fruit. The right fruiting substrate will have the right mix of nutrients, temperature, humidity, fresh air, light, and carbon dioxide levels.

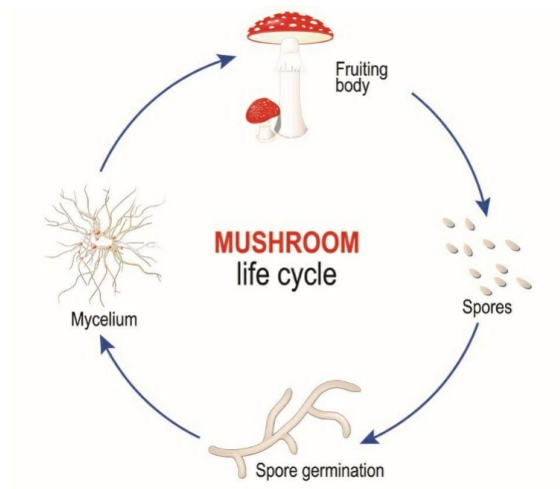
Once you have gotten the fruiting substrate right and you transfer the mycelium, small immature mushrooms, also known as primordia, will begin to grow out from the surface of the mycelial mass.

The moment that the primordia start developing, the mycelium is said to be undergoing pinning. We can also say that the mycelium is beginning to grow actual mushroom fruit bodies.

Even though the primordia will still turn into fully grown mushrooms, you have to take care not to damage the young, immature mushrooms. You can do this by maintaining consistent physical conditions (the right mix of light, temperature, humidity, fresh air, etc.) for the primordia to grow and become stronger.

Once the primordia have grown into fully grown mushrooms, they develop spores, and the spores can germinate, and the life cycle starts afresh.

The above is a simple illustration of the life cycle of mushrooms. In the next subsection, we will look at some of the common mushrooms you can grow at home.



# Chapter Two: Commonly cultivated mushroom species

In this section, we are going to look at the most commonly cultivated mushroom species. These are mostly saprophytic mushrooms, and as a beginner, you are better off starting with one of them. You can easily find cultures of these mushrooms in stores and culture banks as they have been carefully selected for cultivation.

That being said, here are some of the commonly cultivated mushroom species in no particular order:

## 1. Oyster



The Oyster mushroom can be found in almost every country in the world. Its botanical name is *Pleurotus ostreatus*. It is a saprophytic mushroom, meaning that it undergoes primary decomposition. Remember, when growing primary decomposers, you don't need to specially compost the substrate before inoculating.

The Oyster is mostly brown or white in color. You will often find it growing in the wild on tree trunks or dead wood. The stem is usually attached laterally to the cap from one side of the cap. If you want to find it growing in the wild, then you should look out for fallen hardwoods. It is very common in North America and many parts of Africa.

The Oyster is one of the easiest mushrooms to grow at home, and interestingly, it can grow all year round. This means you don't have to wait till a special season or time of the year to grow it.

The most common substrate for growing Oyster mushrooms include birdseed, popcorn, millet, and rye. You will have to place any of these preferred spawn substrates in spawn bags or canning jars.

The fruiting substances that can be used in growing this mushroom include coffee grounds, straw, wood, cottonseed hulls, and cornstalks. You can use fruiting containers of about 15-36 cm in width to grow the Oyster. The fruiting container can be plastic bags or just any plastic tubing.

It takes the Oyster mushroom about two to three weeks to fruit successfully – i.e., grow into fully mature mushrooms. This period starts from the time that the mushrooms have spawned. We will talk about how to prepare the right fruiting material for this mushroom and other types in a subsequent section of this guide.

The oyster is ready to be harvested when the spores begin to drop from the stem. To harvest the mushroom, simply pick clusters from the fruiting substrate. Once you have harvested the mushrooms, more sets of mushrooms can still grow out of the same substrate (this is called “flushes”).

For more flushes to occur, leave the substrates in the fruiting environment until you are ready to start growing the next batch of mushrooms.

It is important to state that some strains of the oyster mushroom also come in yellow, blue, and pink colors.

## **2. Shiitake**



The shiitake mushroom is another popular one that is commonly grown at home. The botanical name is *Lentinula edodes*, and its origin can be traced to Korea, China, and Japan. The mushroom also goes by other names such as Chinese black mushroom, Oakwood mushroom, or black forest mushroom.

It is a saprophytic mushroom, meaning that it undergoes primary decomposition. One of the distinctive features of the shiitake mushroom is that it has brown stem and cap with white hairs on the cap. It also has a meaty flavor, which makes it a favorite in Chinese cuisines.

Apart from the countries of origin of this mushroom, you will not find it growing in the wild in other places. So, if you live in North America, for instance, and you want the shiitake, you will need to grow it yourself. Growing the shiitake is relatively easy, though not as easy as growing oyster mushrooms.

Unlike oysters that can be grown all year round, the shiitake thrives better during spring and fall. If you want to grow it all year round, you will need to prepare a special fruiting substrate using sawdust placed in bags.

The most common substrate for growing shiitake mushrooms include grains such as birdseed, popcorn, millet, and rye. You can also use sawdust as a spawn substrate for shiitake. Quart jars are one of the most common spawn containers for shiitake cultivation – you can also use large spawn bags.

You can use a wood-based fruiting substrate for shiitake. If you want to grow the mushroom indoors, you will have to use supplemented sawdust blocks – however, if you are growing it outdoors, consider using hardwood logs. They will make perfect fruiting substrates for the shiitake mushroom.

Since you are likely going to use hardwood logs or sawdust blocks as fruiting substrates, you will not need fruiting containers. It takes shiitake approximately 60 days to grow from primordia to fully grown mushrooms.

The fruiting time can also be as low as 30 days from the time of inoculation depending on the conditions of the environment..

One interesting thing about the shiitake is that the color constantly changes throughout the life cycle of the mushroom. For instance, when the mushroom has just pinned, the color is light brown. But as it ages, the color gets darker.

It takes the mycelium of shiitake about 2 to 3 weeks to colonize the spawn substrate completely. Once colonization is complete, you will need to transfer the mycelium to the fruiting substrate, such as sawdust block, and expose the block to direct sunlight. This will help to start the fruiting process of the mushroom.

Once shiitake is ready to start fruiting, you will notice some irregular patterns on the surface of the mycelium. For instance, it is common for the mycelium to develop some wart-like growths, with some warts growing to the size of a cotton ball.

When you notice that the irregular growths have become clearly defined, open the spawn bag and make sure you introduce the young mushrooms to the right fruiting conditions.

Some people like to wait until they have seen actual pins shoot out from the mycelium before they transfer to the fruiting substrate. It will likely take the young pins about 45 days to develop into shiitake mushrooms.

The shiitake is ready for harvest when the cap is fully developed. When the mushroom is just fruiting, the cap is formed into a round-ball – this ball will become fully open when the mushroom is ready for harvest. To harvest, simply twist and cut the stem of the mushrooms around the base.

After you have harvested the mature mushrooms, you will need to submerge the sawdust block used as the fruiting substrate in cold water for twenty hours. This will trigger another pinning process.

### **3. Lion's mane**



This is another popular mushroom species that many people love to cultivate at home. The botanical name of this species is *Hericium erinaceus* – it is also often referred to as the bearded tooth, probably because of the fur-like or beard-like appearance of the cap.

You will often find the bearded tooth on felled hardwood across North America. You can also find it in other regions that share the same weather conditions of North America. Like the other species of mushrooms we described above, the bearded tooth is a primary decomposer.

Apart from the beard-like appearance of the mushroom's cap, the cap also looks like a cooked lobster. This mushroom is rarely sold commercially, but if you go hunting for it in North America, you will likely find some on felled hardwood logs.

Like the oyster mushroom, cultivating the bearded tooth is quite easy, and it grows well during late summer and early fall.

Some of the materials that can be used as spawn substrate to grow this mushroom include sawdust and grains such as birdseed, popcorn, millet, and rye. The perfect spawn containers for the colonization of this mushroom include large spawn bags and quart jars.

For the fruiting stage of the mushroom, you will need to introduce the colonized mycelium to sawdust blocks and keep it indoors. You can also use wood as the fruiting substrate if you intend to grow the mushroom outdoors.

If you are growing the mushroom indoors using sawdust blocks as substrate, you can pack the sawdust blocks in polypropylene bags to serve as fruiting containers. Typically, it takes the bearded tooth up to 30 days to

fruit completely from the time of inoculation.

The mushroom is ready to be harvested when the spikes begin to elongate. To harvest the fully grown mushroom, simply twist the stem of the mushroom off the base. The bearded tooth can go through many flushes. A flush simply means a set of pins that the mycelium of mushroom produces.

Normally, mushrooms are capable of pinning many times. The pins come out in batches – after the first set has been harvested, the mycelium that is still buried in the fruiting substrate take some rest and then send out another set of pins which grow into full mushrooms.

For the bearded tooth, multiple flushes are common. So, once you have harvested the grown mushrooms, you have to leave the fruiting substrate in the fruiting environment, then cut or make some tiny holes in new locations where the new fruits or mushroom pins will grow out from.

#### 4. Maitake



This mushroom also goes by the name Speed's head or hen of the woods. Its botanical name is *Grifola frondosa* . You will often find it growing in the wild in Japan and North America, and like the other mushrooms we have described in this section, the hen of the woods is saprophytic or a primary decomposer.

The perfect way to describe this mushroom is that it has lots of grayish petals that grow out of it from a single stalk. So that, unlike other mushrooms that have a single stalk carrying a cap, maitake can grow one stalk that carries a lot of grayish petals.

If you go into the bushes and look closely at the base of oak trees, you will

likely find some maitakes, especially if you do that during fall.

Unlike the other mushrooms we have described in this section, growing maitake is not easy – it is relatively difficult. One of the reasons is that the mycelium of the mushroom grows in an irregular pattern and is also cottony.

You can use sawdust as spawn substrate for growing this mushroom – you can as well use grains such as birdseed, popcorn, millet, and rye. The perfect spawn containers for this mushroom include large spawn bags and quart jars.

For fruiting substrates, you can use supplemented sawdust blocks if you are growing the mushroom indoors. If you are doing outdoors cultivation, then consider using hardwood logs as the fruiting substrate. Additionally, you can use polypropylene spawn bags as the fruiting container. The perfect temperature for growing this mushroom is between 50 and 70 degrees Fahrenheit.

It takes maitake up to 45 days to grow from the inoculation phase to the pinning phase. Once it has started pinning, it takes another 30 to 45 days for the petals to start become fully developed. The maitake prefers to fruit in lower temperatures, lower than the other species we have described in this section.

Now, to grow this particular mushroom, you will need to colonize the mycelium using sawdust blocks placed in a spawn bag or cylinder. Once the mycelium has successfully colonized the spawn substrate, place the bag containing the spawn substrate in an upright position, and leave it like that for another three weeks or four. During this period, make sure you expose the colonized spawn container to light, preferably indirect sunlight.

In the third or fourth week, you will start to notice that some grayish clumps are beginning to form on the surface of the sawdust block used as spawn substrate. It will take another two weeks or more for the grayish primordia to reach the height of about 5.1 cm or 2 inches. Once this happens, make a slit in the bag containing the sawdust block just above the block and introduce fruiting conditions – fruiting conditions will include high humidity, which is about 75 – 85%, the right temperature, and light.

Cutting a slit on the spawn bag or container will allow air and light to get to the little primordia that are just growing out. It will also encourage the proper development of the petals or fronds of the mushroom.

After three weeks, proceed to cut out the upper part of the spawn bag

completely, leaving only the sawdust block containing the young mushrooms. Getting to this stage of the process may likely take up to 60 days, this is one of the reasons why I mentioned earlier that growing this mushroom is relatively difficult – it takes a lot of time.

After you have cut out the upper part of the spawn bag and introduced the right fruiting conditions, it will still take the mushrooms another 2 to 3 weeks to develop completely. You will know that the mushroom is ready to be harvested when you notice that the edges of the petals or fronds have started darkening. To harvest, remove the fruit body from the base of the stalk.

This species of mushroom does not undergo multiple flushes – so once you have harvested the first set of fruit bodies, you will have to repeat the entire cultivation process again, which takes a lot of time. This is yet another reason why this mushroom is relatively difficult to grow.

# Chapter Three: Tools you need to get started



You are now finally ready to start growing your own mushrooms at home – this chapter will discuss some of the basic kits you need to get started.

## Ready to grow kits

People who want to grow mushrooms don't often know where and how to start. They don't know where to get all the materials they need, and they also don't know where to get all the cultures they need.

If you fall into the category of people described above, your first and best option would be to get ready-to-grow kits. With these ready-to-grow kits, you can grow some of the popular species of mushrooms described in the previous section.

In the kit, you will find the mycelial mass of your favorite mushroom – which has already been prepared and is therefore ready to enter the fruiting stage. So, you don't have to start with growing the mycelium with these types of kits – you simply need to introduce the right fruiting conditions, and the ready-to-grow mycelium will enter into the fruiting stage.

The major advantage of using a ready-to-grow kit is that you don't have to worry about sterilizing the spawn substrate you want to use.

You also don't have to worry about maintaining mushroom cultures, or bother yourself with colonizing the spawn substrates – everything has been done for you – just pay and get started. Interestingly, you can buy these ready-to-grow kits online – a simple Google search will lead you to websites that sell these types of kits around your area. You can also buy one from Amazon.com.

As a beginner, using the ready-to-grow kits is the perfect option for you. However, when you have perfected the techniques, you could consider experimenting with some of the procedures involved in growing mushrooms from start to finish. You can consider sterilizing the culture and doing inoculation yourself.

The ready-to-grow kit will contain a sawdust block placed in a transparent polypropylene patch bag. The sawdust, which is the substrate, has already been colonized with the right mycelium of your choice.

If you want to grow oysters, for instance, you just pick a kit that has been colonized with oyster's mycelium.

When you look at the bag containing the colonized substrate, you will see some labels – the labels indicate the type of mycelium in the bag and the date that the bag was inoculated.

Other tools you will find in the ready to grow kits include a plate, humidity tent (this will help you ensure you have the right humidity for the growth of your chosen mushroom). You will also find a spray bottle in the kit.

Another good thing about using ready-to-grow kits is that the vendor will provide you with all the instructions you need to make sure the fruiting stage of the mushroom is successful. The instructions will vary depending on the type of mushroom you want to grow.

Various mushrooms have different humidity and temperature needs – so, if you have purchased a kit for maitake, the instructions will explain the fruiting conditions suitable for maitake. In most cases, all you have to do after getting your kit is to cut a slit on the spawn bag just above the substrate block.

After that you have to remove the substrate block and set it on a plate and use the included humidity tent to cover the block. The humidity tent is already prepared for the type of mycelium that was used to colonize the substrate.

Next, you may need to water the block several times a day, depending on the type of mushroom you are growing.

The good thing is that several species of commonly cultivated mushrooms are available as ready-to-grow kits. Also, the kits don't cost much – you can get one for as low as \$18 on Amazon. With these kits, you are sure to harvest your first home grown mushrooms within a span of 2 weeks. If you follow the instructions on the kit religiously, you should expect a success rate of up to 98% on your first attempt.

# Growing shiitake mushrooms from a ready to grow kit



Let's briefly describe how to grow shiitake mushrooms from a kit. First, you have to buy a shiitake mushroom ready-to-grow kit and follow the instructions below.

## Step 1: Wait for the buttons

Remember, the shiitake is the mushroom that grows a ball-like cap that becomes open when it is ready to be harvested. The fruiting stage of the mushroom starts when small brownish button-like caps begin to grow out from the mycelium. This usually happens around 45 days from the date of inoculation.

So, if you want to grow shiitake mushrooms from a kit, the first thing you will need to do is to look at the label on the polypropylene bag containing the substrate block.

The label will show the day that inoculation was started and the type of mycelium growing on the block. If it hasn't been 45 days since the date of inoculation, then you should not cut open the bag to remove the spawn substrate or sawdust block.

While you are waiting for the 45-day period to pass, make sure the bag is well sealed, then place it in a spot where it will always receive indirect sunlight. Leave the bag in that spot until 45 days from the date of inoculation has passed, then continue to step 2.

**Note:** after 45 days from the date of inoculation, some people often prefer to still leave the block in the bag for a few more days or weeks until they start seeing little buttons shooting out from the surface of the block. Those little buttons are the shiitake mushrooms that are beginning to grow out.

Any approach you adopt is good – if you want to remove the block from

the bag after just 45 days, then go ahead. If, on the other hand, you want to wait till you see small buttons forming on the block before you cut the bag open, that's also another great option.

## **Step 2: Remove the block from spawn bag**

You will have to cut a slit on the bag just above the block and remove the substrate. However, before doing that, you will need to ensure you won't introduce impurities to the block.

You will do this by washing your hands properly. After washing your hands, cut the bag, remove the block and place it on a plate that would come with the kit. If the kit doesn't come with a plate, consider placing the block on a dinner plate.

Once you have removed the white block from the bag, you will be introducing the mycelium to a massive influx of oxygen, which is one of the fruiting conditions it needs to start fruiting.

## **Step 3: Assemble a humidity tent**



The major use of a humidity tent is to keep the block from drying out. Most ready-to-grow kits come with humidity tents, which you have to use in covering the block from the external elements.

Make sure the tent does not touch the block. The tent should hang just above the block while the loose ends should be tucked under the plate.

If your ready-to-grow-kit doesn't come with a humidity tent, you can create one yourself using transparent plastic shopping bags. You can use chopsticks to loosely hang the tent above the block.

Stick about four chopsticks into the four cardinal points of the block and hang the humidity tent on the ends of the chopsticks. No, sticking

chopsticks into the block will not harm the mycelium or fruiting mushrooms. Make sure you arrange the chopsticks in a way that they will keep the tent away from the top and sides of the block.

#### **Step 4: Place the contraction in a good location**

After covering the block with a good humidity tent, then it is time to place the setup in a conducive location.

You should look out for a free space in your house where the block will not be disturbed by humans, pets, or air currents – that's the kind of place you should place the block. Also, ensure that the place you want to place the block receives enough light. While light is good for the fruiting mushroom, direct sunlight will damage the young primordia.

Even though mushrooms are not plants, they require light, just like plants to grow. If you place the block in a dark area, the mycelium on the block will not fruit properly.

Shiitake doesn't need special temperature requirements to grow – it does well in normal room temperature. While leaving the block in room temperature will make the mushroom turn out good, you can still place the block in cooler locations if possible.

#### **Step 5: Care for your mushroom daily**

It is not just enough to set up the kit and leave it – you have to care for the mushrooms daily. You can do this by misting the block daily.

To mist the block, carefully remove the humidity tent and sprinkle water on the block. You can use a simple spray bottle for this purpose. A spray bottle will ensure that the water sprinkles evenly on the block.

A best practice is to sprinkle the block two to three times a day – the first one should be done in the morning while the last one should be in the evening. If you have time during the day, you can also do one more water sprinkling session in the afternoon.

When sprinkling the block, you have to be extremely careful, especially if the mushrooms have started to form. At this time, you shouldn't spray water on the young primordia directly.

Direct the spray bottle so that the water goes around the young mushrooms. After every misting session, make sure you replace the humidity tent and be careful while doing this to ensure the tent doesn't touch the top or sides of the block.

## **Step 6: Harvest**

The shiitake mushroom will become fully developed after two weeks from the time you first removed it from the spawn bag. As soon as the mushrooms are ready to start shooting out from the block, you will notice small bumps on the surface of the block. The bumps will eventually grow into full mushrooms with stems and caps. Also, the color will change from whitish to brown.

Normally, the block that your mushroom is growing on comes in a white color, but as time goes on, the color might change to brown. This shouldn't bother you as it is just a simple indication that the block is aging.

Your shiitake mushroom is finally ready to be harvested when the cap opens up and separates from the stem. At this point, you will notice that the cap has flattened out instead of appearing roundish.

Make sure you harvest the mushrooms before the edges of the cap begin to turn upward, which is an indication that it is losing its juice and drying up.

You can harvest with scissors – simply cut the stem of the mushrooms at the base. You can also harvest with your hands – simply twist the stems of the mushrooms at the base until they come off. After harvesting the first set of mushrooms, you should expect to get three or more flushes of mushrooms from that same block.

After harvesting the first set, you have to prepare the block for the second flush. You can do this by removing the humidity tent. You also have to stop misting since there are no more mushrooms growing on the block at the moment. Since you are no longer misting the block, it will dry out a bit – this shouldn't bother you. Leave it like that for up to a week.

After a week, soak the block in a bucket or bowl of cold water and leave it there for 12 to 24 hours. The preferred type of water for this exercise is rain or spring water.

If you cannot find rainwater or spring water, you can use tap water, but be careful: you should never use chlorinated or distilled water to soak the block.

When you just place the block in water, it will float – so you will need to leave it in the bowl of water for twenty-four hours for it to soak in a lot of water and become submerged. If you notice that some green molds are beginning to grow on the body of the block, gently wash off the mold in running water.

After harvesting each set of mushrooms that grow on the block, repeat this

same soaking/dunking process. You should discard the block when it is no longer producing mushrooms or when it only produces few mushrooms.

## **Growing mushrooms with premade spawn**

You have come across the word “spawn” in this guide and probably wondering what it means.

Well, a mushroom spawn is simply a mycelial mass which has been grown to be transferred to another substrate. When you transfer spawn to another substrate, you allow the mycelium to colonize the new substrate, thus increasing the number of mushrooms you are going to have from the original mycelial mass.

The same way we have ready-to-grow mushroom kits that contains already prepared mycelium that is ready to grow, we also have premade spawn. The premade spawn can come in many forms – some that are grain-based usually come as millet or rye that has been colonized with a chosen mycelium.

The grain is then placed in half-gallon or quart canning jars. If you want to have more mycelial mass from one jar, you simply need to transfer some of the colonized grains to another jar under sterile conditions.

Apart from grain spawn, sawdust spawn is another popular example of premade spawn. The procedure is the same as that of grain spawn. Sawdust is colonized with mycelium of interest for the purpose of transferring the spawn to another jar to increase the future number of mushrooms that could be gotten from the spawn.

Premade grain spawn usually come in polypropylene patch bags – each bag contains about 2.3kg or 5 pounds of a certain type of grain, usually millet or rye, which has been colonized with the mycelium of your choice.

To commence the fruiting of the mycelium, the bag of grain spawn or several bags of the material as the case need to be transferred to a fruiting substrate. The fruiting substrate, in this case, could be pasteurized straw (normally used for oyster spawn) or sawdust blocks. Toilet paper rolls can also be used as fruiting substrates for grain spawn.

It is important to state that the major reason why anyone would want to grow spawn (which is simply large amounts of mycelium) is that it allows you to get more mushrooms.

Just like premade grain spawn, premade sawdust spawn also comes in

polypropylene bags containing about 5 pounds of sawdust that have been colonized with the chosen mycelium. The sawdust spawn can be broken and transferred to other substrates.

Sawdust spawn is often used to inoculate hardwood logs on which mushrooms can grow outdoors. Sawdust spawn can also be transferred to enriched sawdust blocks to grow more mushrooms. You can make your own sawdust block – the process on how to do that will be explained in a subsequent section of this guide.

In addition to the two types of premade spawn described above, another type of spawn which you can use to grow mushrooms is the plug spawn – this type is used mostly for the outdoor cultivation of mushrooms.

The primary material that is used to form this spawn is a 8mm×2.5 cm spiral-grooved birch dowel pins, which is usually colonized with the mycelium of choice.

The colonized pins can be transferred to hardwood logs for the purpose of inoculating the logs. This is why I mentioned earlier that this spawn method is mostly used for outdoor cultivation of mushrooms.

Using plug spawn to grow mushrooms is not that difficult – you simply need to drill a hole into the log that you plan to use. Next, hammer the colonized pins into the holes that you have drilled. You may use a small hammer or lightweight material to drive the pins into the log.

Since the pins are already colonized, the mycelium on them will go on to colonize the wood, and mushrooms will fruit from the log. We will talk about this process in detail in a subsequent section of this guide.

In the next section of this guide, we will look at different ways of starting your mushroom cultivation adventure with oyster mushrooms. You will also get to understand why we chose to start with oysters.

# Chapter Four: Starting with oysters

Oyster mushrooms are one of the easiest mushroom species that you can grow at home. It is also recommended that beginners start learning how to grow mushrooms using oysters for various reasons. One of the reasons, apart from the fact that oysters are easy to grow, has to do with the fact that oysters can grow on a variety of substrates.

So, the methods we will be looking at in this chapter are tailored specifically after oyster mushrooms. However, if oysters are not your favorite mushroom species, you can still apply some of the techniques you will learn in this chapter in growing your favorite mushroom species. All you need to do is to put on your thinking and creativity hat and do some experimentation.

As mentioned earlier, oyster mushrooms are one of the easiest to grow – they can grow on virtually anything that contains cellulose. So, if you introduce cellulose to most materials, the oyster mushroom would grow on such a material.

Oyster mushrooms can grow on toilet tissue papers, newspapers, books, and even hard concrete. So, if you want to grow them, you may not need to pay for special fruiting substrates – common household items or materials can do a perfect job of serving as fruiting substrates.

Another reason why oyster mushrooms are easy to grow is that they exhibit aggressive growth behavior. Once you introduce the mycelium of the mushroom to a medium, the mycelium quickly colonizes enough surface of the substrate they are introduced to.

What we cited above are the reasons why oyster mushrooms are some of the most recommended for beginners who are still learning the ropes. To grow oysters, you may simply need to order oyster sawdust spawn or grain spawn, then use it to colonize the fruiting substrate you want. Next, sit and watch your mushroom colonize the entire fruiting substrate and start fruiting.

With oyster mushrooms, you can expect high success rates – and this is notwithstanding the growing method or process you choose. When you have gotten your oyster spawn (either sawdust spawn or grain spawn), there are a lot of methods you can use to grow the spawn into full mushrooms. We already mentioned that oysters grow on a wide variety of mediums.

If you have some logs lying idle in your backyard, you can transfer the spawn to the log, colonize the log and grow your oyster mushrooms. This is often the easiest option that many beginners adopt. If you don't have some logs lying around in your backyard, you can transfer the oyster spawn to some common cellulose-containing material in your home such as toilet paper or even newspapers.

In the next subsection of this chapter, we will look at how to use oyster spawn to inoculate toilet tissue paper. You can use the same techniques or methods described here to inoculate shreds of newspaper and other cellulosic materials.

Note: using materials such as toilet paper or shreds of newspapers to grow oyster spawn is not ideal for commercial purposes – of course, this should be known to anyone.

I would recommend that you grow oysters on these mediums as a means of learning the ropes. With these experiments, you will get to understand the growing habits of oyster mushrooms, which you can then apply when growing other species. When you have become confident that you can successfully fruit oyster grown from purchased spawn, you can start growing the same oyster from the spawn you can prepare by yourself in the future. This way, you are sure of not wasting your time and resources.

## **How to fruit oyster mushrooms on toilet papers**

**Materials you will need for this experiment include :**

- **Oyster spawn** – this can be sawdust spawn or grain spawn (you can purchase oyster spawn or the spawn of any mushroom species of your choice on Amazon).
- **Toilet paper rolls** – you don't need those colorful ones with patterns or designs. Basic white rolls of toilet paper are what you need. The ones with added scents, colors, and designs will interfere with the spawn you want to fruit, and you don't want that.
- Large filter patch bags.

### **Directions:**

1. Pour water in a pot and boil it. Once the water has boiled, toss the roll of toilet paper into the sink and the pour hot water on it. You can also dip the tissue paper into the pot of boiling water. Use the method that is most

convenient for you.

If you are going to place the tissue paper in a sink and pour the hot water on it, you will need to put something like an oven rack in the sink before pouring the water. This is to ensure that the tissue paper doesn't dissolve and stick to the body of the sink.

The aim of pouring hot water on the tissue paper or dipping it into water is to pasteurize it. The heat of the water will kill impurities in the toilet paper that would harm your mushroom spawn.

2. Inoculate the rolls – to inoculate the rolls of tissue paper; you simply need to introduce the oyster spawn you purchased to the tissue paper.

Before inoculating, make sure you have allowed the tissue paper to cool – after dipping it in hot water, place the roll on a plate and allow it to cool.

Next, use your hand to gently crumble the oyster spawn and use the crumbled spawn to fill the interior of your toilet paper roll. In addition to filling the interior of the tissue paper roll, you can also rub some of the crumbled spawn on the surface of the roll.

After that, use a filter patch spawn bag to cover both the tissue paper and the plate it is sitting on. Use a string or rubber band to tighten the top end of the filter bag.

3. Mist the toilet paper roll several times a day. It is important for you to do this, so the tissue paper doesn't dry out. Air and water are critical to the growth of the mushroom.

So, you have to open the filter bag at least two times a day for air to get to the spawn. Each time you open the bag, use a spray bottle to spray water on the tissue paper roll.

Don't just spray the tissue paper with water; you should also moist the inner sides of the filter bag – while doing this, make sure you don't allow water to pool in the bottom of the bag. If you don't have time to water the bag and its contents two or three times a day, you can do it once a day, and the mushroom would still fruit well.

4. If you water your spawn consistently and ensure it is properly aired, then your tissue paper roll should be properly colonized with the spawn in two weeks or less – with oyster mushroom spawn.

After full colonization, you should start seeing your mushroom fruiting after another week or two. Again, if you are using oyster mushroom spawn, the fruiting would start much earlier.

At this point, you should already know when your mushroom is ready to be harvested. So, once you have observed that your mushrooms are ready to be harvested, simply twist the stems of each mushroom at the base. You can also use scissors to cut the fruits from the stalk or stem.

After the first harvest, the inoculated tissue paper can still produce one or two more flushes. This is provided you don't allow the tissue paper to dry out – you can achieve this by making sure you sprinkle it with water every day even after harvest. After the first harvest, the next flushes should start after a week or a few days later.

# Chapter Five: Growing shiitake mushrooms from a plug spawn

In the previous section, we looked at how to grow oysters using tissue paper rolls (as fruiting substrate). In this section, we will look at how to grow shiitake mushrooms using plug spawn. Remember, using plug spawn is one of the easiest ways of growing mushrooms at home. Plug spawn is colonized pins that can be used to grow mushrooms on a log of wood.

Also, using plug spawn is one of the easiest ways that you can grow your own mushrooms outdoors. Just like any type of spawn, you can purchase a plug spawn kit that contains all the materials you need from Amazon or any other online store that is more accessible to you.

Using plug spawn to grow mushrooms only works when you want to grow mushrooms that are classified as wood decomposers. These species of mushrooms decompose hardwoods to release nutrients that the mushroom absorbs in order to grow.

Common mushrooms that fall into the wood decomposers category include oyster, shiitake, Reishi, Lion's Mane, and Maitake. So, if you have the plug spawn of any of these mentioned species of mushrooms, you can use the spawn to colonize a log of wood outdoors and grow the mushroom.

The process involved in using plug spawn to grow mushrooms is straightforward – you need to drill holes on the log you want to grow the mushrooms on. Then, drive the pins that have been colonized with your favorite mushroom species into the drilled holes. After driving the pins into the holes, place the log in a shady location, and wait for some months for the log to be fully colonized.

One major con of growing mushrooms using plug spawn is that it takes several months for the wood to be properly colonized. It is going to take around 9 to 12 months for the log to be fully colonized. On the positive side, once the log has been properly colonized, you are sure to continue harvesting mushrooms from it for another 3 to 5 years. So it is still a win-win for you.

If you are thinking of the best hardwood species to use for this mushroom cultivation, then you should worry no more as most hardwood species will be suitable.

However, if you have access to oak logs, then you should consider that.

Oak logs are stronger than most others – as a result, it will take time to be decomposed. The same way it would take time for the log to be fully colonized, the log will also produce mushrooms for many years before getting totally deteriorated.

Other hardwood species that will also work well for mushroom cultivation include alder, willow, sweetgum, elm, maples. These species of trees have prominent barks that don't easily get chipped off. Some of the tree species you should avoid using as fruiting substrate include dogwood, hackberry, cedar, and conifers.

You should look out for tree species that can hold moisture for an extended period – such logs will ensure you harvest mushrooms over and over. You should also avoid logs that have stayed outdoors for an extended period. The reason for this is that the more a log of wood stays in the open air, the more is the probability that it has been colonized by many of the naturally occurring fungi in nature.

So, trying to recolonize such logs will be counterproductive. You want a log that has stayed in the open air for just a short period. Ideally, you should be looking for trees that were cut in the last three months. Such trees have not been colonized by natural fungi that will compete with your mushrooms for nutrients.

If you want to cut your own log and prepare it for mushroom cultivation, the best time to do that is when the tree is dormant. A tree is most dormant when its leaves have fallen off – this happens around fall.

Make sure you cut the log before the tree starts developing the next leaf buds in early spring. Woods cut when they are most dormant contain more nutrients – so you will be sure to harvest more mushrooms. However, you can still harvest a log during any time of the year and still have bumper mushroom harvest as long as you follow the right colonization and inoculation techniques.

The best logs for growing mushrooms are those that are between 4 and 6 inches in diameter – they are the type that will hold moisture for a longer period. Logs that are below 4 inches in diameter will have a hard time holding water for a longer period. Without enough moisture in the log, colonization will be hard.

Additionally, if you are using logs that are greater than 8 or 10 inches in diameter, the mushroom spawn will find it hard to colonize the entire log

fully.

This will result in partial colonization, which isn't particularly good. Apart from the issue of partial colonization, you will also have a tough time working with larger logs.

This is not to mention that you will need more pins to be able to colonize the wood completely. More pins mean you will spend more money without necessarily growing more mushrooms in return. When it comes to the length of the wood, the ideal length should be between 2 and 4 feet. The reason for this is the same as we have seen earlier.

Having talked about the materials you need to grow shiitake on hardwood logs, let's proceed to look at the procedures you need to follow to achieve that.

Before that, we have to mention that the methods we are about to describe works well for small scale cultivation, but you can also scale it up and use it for large scale production.

As a beginner, you might want to start by cultivating 3 to 4 logs at a time. When you have become confident in your skills, you might consider adding more logs. That being said, here are the steps you should follow to grow mushrooms on hardwood logs.

# Steps to grow mushrooms on hardwood logs

## Step 1: Harvest and hydrate your logs

Cut the logs you want to use to grow your mushrooms and allow them to sit around for 2 to 3 weeks. Don't make the mistake of inoculating freshly cut logs with pins immediately or you will be wasting your money.



Mushrooms are fungi, and living trees produce antifungal compounds that help protect them from fungi. So, if you inoculate a freshly cut tree, antifungal compounds in the tree will kill the mushroom spawn you are trying to introduce to the tree, thus wasting your money.

The naturally occurring antifungal compounds in trees begin to lose power shortly after the tree has been cut. So you have to wait for some days or weeks for the compounds to completely dissipate before you inoculate the wood using your favorite mushroom spawn.

Weeks after the freshly cut log has been lying idle, soak them completely in water and allow them to stay soaked for 24 or even 48 hours. This is to ensure the logs are properly moisturized before inoculation. Enough moisture means strong moisture growth.

## Step 2: Drill holes in the logs

After moisturizing the logs, then it is time to drill holes in them where the plug spawns will fit in. You can use a 0.8cm drill bit for this purpose.

Make sure the holes are straight and 4 to 6 inches apart and 3.8cm deep. To get the proper drill depth, set your drill bit to stop automatically once the hole has reached 3.8cm in depth.



### **Step 3: Insert pins or plugs into the holes**

After drilling straight holes into the logs of wood, it is time to drive the plugs or pins into them. You can use a common hammer or a soft/rubber mallet for this purpose. Ensure you drive each pin completely into the hole such that the top of the pin is below the surface of the log's bark.

### **Step 4: Seal the holes**

After driving the pins into the holes, use beeswax or melted cheese wax to seal the holes and protect the pins from external elements. You can do this using a brush – use the brush to collect the wax and properly cover each hole.

Apart from protecting the inoculation site from the external elements, sealing the hole will also protect the mushroom strains from competing for nutrients with other external fungi and molds.

### **Step 5: Do some aftercare**

It is not just enough to inoculate the logs by driving pins or plugs into them; you have to expose the logs to the best fruiting and colonization conditions to allow for proper colonization.

First, you need to find a shady location and place the logs – this location should be free from direct sunlight. Any shaded area in your backyard will be ideal for this. You can also lean the inoculated logs against the walls of your house, away from direct sunlight.

If you have enough logs, you can use them to construct a barn-like structure, then use mesh cloths to cover the top. If you intend to grow Maitake and Reishi on the logs, then you will need to bury parts of the log into the ground.

If it is raining season, then you can rely on natural rainfall to hydrate the logs. However, if it is the time of the year when the weather is dry, you will need to water the logs occasionally.

Watering the logs shouldn't be an everyday affair – just do it enough to keep the logs moist. Make sure you check the logs every other week to assess how moist they are – if they appear dry, water them.

If you are inoculating your logs during the winter, then you might consider covering them with a breathable tarp or straw. Avoid covering the logs with plastic material as this could make the logs to grow molds.

### **Step 6: Wait for harvest**

If you have inoculated the woods properly and placed them under the right fruiting conditions, then you should start seeing the first fruits after 8 to 10 months. If you inoculated your woods in the spring, then you should expect them to start fruiting by fall.

Of course, this will depend on so many factors like how often you moist the logs, the dimensions of the logs, temperature, weather, etc. After the first inoculation, you should expect multiple flushes from the same logs in the next couple of years.

When the mushrooms start growing out from the logs, the image below shows what they will look like.



# Chapter Six: Syringes

When you visit your favorite online or offline store and buy some premade mushroom spawn, what it means is that you are growing mushrooms from the culture prepared by another person. You cannot be said to be growing your own mushrooms from scratch.

The spawn you bought was prepared by someone else – this same person sterilized it to be sure it is free from impurities.

Up until this point in this book, we have been looking at ways of using ready-to-grow kits to cultivate your own mushrooms. We have also looked at ways of using premade mushroom spawn to do the same.

Now, if your interest is to go a notch higher in the mushroom cultivation business, then you would want to learn how to perform some of the steps involved in the cultivation of mushrooms.

Some of these steps involve growing your own spawn culture from scratch instead of purchasing premade ones.

To make your own mushroom spawn, you will need to introduce mushroom spores to a substrate. The spores will grow into mycelium, inoculate the substrate, which you will then transfer to the fruiting substrate.

To perform the procedure described above, you will need to have some mushroom spores. However, the major problem with handling mushroom spores is that the spores can easily be contaminated.

Remember, mushrooms are fungi – and for them to grow, they will have to outcompete other naturally occurring fungi. So, if you don't protect the spores you want to grow into mycelium, they would be contaminated.

One way to protect mushroom spores from contamination is to transport them using what's called spore syringes. Spore syringes will protect the mushroom spores from contaminants such as bacteria and other fungi that may be competing with the spores for nutrients.

To grow your initial mushroom culture from a spore syringe, you will simply need to purchase a spore syringe, then use the spores in the syringes to colonize a substrate. The spores will grow into mycelium – you will then use the spawn to colonize more substrate; introduce fruiting conditions, and finally you can have your mushrooms. Many people - when they are just starting to grow mushrooms - make use of ready-to-

grow kits and premade spawn. Others also purchase spore syringes and grow their own culture by themselves. Normally, spore syringes come in two types – there are the normal spore syringes and the liquid culture syringes.

As a newbie, you are better off starting with liquid culture syringes. You simply need to ask for the liquid culture syringes for the mushroom species you want to grow. Liquid culture syringes are better because of their better rates of colonization and fruiting ability.

Liquid culture spore syringes are just syringes filled with mushroom spores mixed with sterile liquids. The sterile liquid helps to protect the spores. The only reason you should consider buying ordinary spore syringes rather than liquid culture syringe is if the mushroom species you are looking for isn't available in liquid culture form.

As always, you can buy spore syringes on Amazon.com or other online stores. A simple Google search will lead you to lots of online stores that sell spore syringes. A single liquid culture spore syringe typically costs around \$10 to \$20.

## **Why spore syringes**

You have learned what spore syringes are. Now, you might be asking, “why spore syringes?” The answer is – the same way you can find some mushroom species as premade spawn and ready-to-grow kits; for some mushroom species, you can only find them as spores.

So, for those mushroom species that are only available as spores, the only way for you to grow them is to transfer the spores from the point of growth to where you want to cultivate the mushroom. There is no better way to do this and avoid contamination except by transferring the spores in syringes.

A spore syringe is just your typical 10 or 20 cc syringe with about a 16-gauge needle. The only difference is that the syringe has been filled with a sterile liquid (mostly water) mixed with particular mushroom spores.

Individual mushroom spores are very microscopic in nature – so they are suspended in the syringe by the sterile water. Since the spores are not necessarily touching the inner sides of the syringes, they are protected from impurities and contaminants.

Now, to use a mushroom spore syringe, you need to inject the liquid substance into your prepared substrate. The substrate will then be

colonized by the spores. Next, you will split the substrate if you desire and use it to colonize more substrates. Once the colonization of the spawn substrate is complete, you can transfer the spawn to the fruiting substrate, introduce the right fruiting conditions, and you have your mushrooms growing.

When you get a mushroom spore syringe, you will notice that the water appears like it contains some dark spots. This shouldn't bother you – you have to remember that individual spores are microscopic and are only visible when they appear as a lump or cluster.

The right spore syringe will have some black-like particles floating around – these are spore masses. Some spore syringes look like they contain heavy black inks – this is not abnormal – it simply means that the concentration of spores in the syringe is high. If you use such spore syringes, it means you will use fewer liquid to inoculate bigger substrates.

Some mushroom growers don't really concern themselves with the number of spores that appear in a spore syringe. In fact, no matter the amount of spores in a syringe, some growers go ahead to inject the same amount of spore-liquid mixture into a substrate for inoculation. A good practice you should adopt when inoculating a substrate with spore syringes is to inject as much liquid into the substrate as possible. Injecting enough of the liquid into a substrate will help to ensure you don't limit the distribution of the spores within the substrate. If you inject a small quantity of liquid, you will likely inoculate a smaller surface area of the substrate.

You will find liquid culture syringes for most species of edible mushrooms.

## **Protecting your spore syringes from contaminants**

When you order a spore syringe – it is your responsibility to protect the spores in the syringe from contaminants until you have successfully used the syringe to inoculate your well-prepared substrates.

You will need to handle the syringe with care – not only that; you have to take care when preparing your substrate, so you don't contaminate the whole process through that.

As we have been reiterating several times in this book: mushrooms are fungi. So, when growing mushrooms, they will be competing with other naturally occurring fungi and bacteria. It is your job to ensure you keep away those competing bacteria and fungi to give your mushroom the

perfect conditions to grow.

It is important to state that the best substrates that are conducive to the growth of mushrooms are also conducive to the growth of other fungi and bacteria. So, the more effort you put into ensuring that your substrate is free from other competing and harmful bacteria and fungi, the better for you and your cultivation..

When your ordered spore syringe gets delivered to you, it is necessary that you use the spores to inoculate your spawn substrate as soon as possible and start the process of growing out your mycelium.

This is to ensure that your mycelium colonizes enough surface area of the substrate before the other competing bacteria and fungi “*wake from sleep*”.

One of the best ways to protect your mushrooms and spores from contamination is to keep your environment as clean as possible.

Molds, which are one of the substances that compete with your mycelium, grow on dirty dishes.

Leftover foods that are exposed to the elements will start growing molds in no time. So, if you do your dishes all the time and ensure your kitchen sink is clean at all times, you will be protecting your mycelium. Also, you should make sure to frequently dust your knick knacks.

Your bathroom is also another strategic place that molds grow. If you keep your bathroom clean at all times, you will be protecting your mushrooms. If you allow contaminants to grow in these mentioned places, the grown contaminants will multiply and jeopardize all your hard work and efforts.

Even if you think or feel that your house is clean, it still makes sense to clean and dust it all the time when you are growing mushrooms. No matter how clean a house may appear, there will always be dust particulars lurking around in several holes and crevices. These dust particles are not just particles, as you might want to think.

Dust particles contain contaminants such as dead and exfoliated human skin, fungal spores, plant pollen, clothing fibers, and many other substances. These substances can compete with your mycelium for nutrients and reduce the rate of colonization of your substrates.

So, it is important that you clean your house properly before proceeding to transfer the spores from a spore syringe onto a substrate, especially if the process is completed in an open and unsterile space. Most importantly, don't forget to sterilize all the tools or kits you will use for your cultivation

work.

Even if you step out and pick another tool and bring it into your cultivation space, you should sterilize the tool before using it. It doesn't matter if the tool is just making contact with the air in your cultivation area.

## **How to clean your space during any cultivation exercise**

Previously, we mentioned some of the steps you should take to clean up your house before starting any mushroom cultivation exercise. Now let's have a deeper look at the process.

### **Before you start**

Here are things you need to do before starting any mushroom growing procedure, especially if you are using a spore syringe:

- Make sure you clean your house thoroughly – this cannot be overemphasized. Wash any dirty dishes in your sink. Dust and mop the floor and remove cobwebs.
- Use detergents to clean the carpets. You may need to do this only once.
- Clean your refrigerator and remove food debris that may be in there.
- Check your garbage disposal and ensure there is no trash in there. If there is trash, dispose it appropriately.
- Remember, the bathroom is one of the many places where molds and algae can grow in your house. So, it is important for you to pay special attention to this space – look at all the crannies, nooks, and areas with humidity. Areas with high humidity should be of major interest to you because that's where molds grow the most.
- Make sure you keep the trash can outdoors – do not let it sit indoors,

even if it is empty. Also, always use lids on trash cans.

- Dust the blades of your ceiling fans – they harbor clouds of dust that also harbor contaminants.
- If you have indoor plants, then take them outside. The soil that these indoor plants grow on can harbor fungi.
- Wash your bed linens
- Keep pet beds and areas sparkling clean
- Do not keep shoes indoors – they should be left at the door.

## **When you are preparing to start your cultivation work**

Here are things you should do to keep your cultivation space clean:

- Put off fans and central air conditioners
- Prepare a mixture of bleach and water in the ratio of 1:10. You can also use other cleaning agents like isopropyl or Lysol. No matter the cleaning agent you want to use, make sure you maintain the same ratio with water, i.e., 1:10.
- Wash your hands, and if you haven't taken a shower, do so.
- Instead of working on the floor, create a hard, smooth surface and work on it.
- Wear hairnets and dust masks – this is to prevent contaminants on your body from getting to the culture you are working on.
- Endeavor to run air purifiers in your work area.

## **When the work is ongoing**

Here are precautionary steps you should take when the cultivation work is ongoing:

- Make sure you don't let expired bread to keep lying in the fridge
- Your garbage can should be clear from food
- Constantly keep your work area clean by vacuuming regularly. You should be careful while doing this as vacuum cleaning might kick up unwanted particles.
- Don't open expired food or other substances inside the house – take

them outside and make sure you properly dispose them outdoors.

## **Enemies to watch out for**

It is no longer news to you that when you are growing mushrooms, the mycelium constantly competes with other fungi and bacteria for nutrients. The reason for this is that the same conditions that aid the growth of the mushroom also supports the growth of the other competing fungi and bacteria.

As a mushroom grower, you need to know some of the most common organisms that may compete with your mushrooms for nutrients.

So, in this subsection, we are going to look at some of these contaminants and how you can protect your mycelium from them.

One of the most common organisms that compete with mushrooms for nutrients is mold. Both mushrooms and molds are fungi – so it is quite easy for them to grow in the same environment while competing for nutrients.

The problem with allowing contaminants such as molds to come in contact with your substrate is that they will outgrow your mycelium.

Molds grow typically faster than the mycelium of any mushroom. Once the unwanted molds succeed in colonizing your spawn substrates before your mycelium, then your mycelium will not have enough nutrients and space to grow.

The problem of molds and other contaminants competing with the mycelium is one that prevents many mushrooms growers from continuing the adventure.

If you don't know how to control molds, you will have a hard time growing mushrooms. It can be quite heartbreaking to have to throw away an entire spawn jar because molds took over the jar instead of your preferred mycelium. This is something that many beginners have had to deal with.

When you are just a beginner, you will experience many instances of mold contaminating your culture. However, as you progress, you will begin to learn to protect yourself from such an instance. As your skills improve, you will begin to understand the best ways to spot contaminants early enough and remove them.

The best way to protect your culture from contaminants still remains to spot them early enough and prevent their growth or spread. So, in the next

few subsections, we will be looking at how the various contaminants look like – this is to help you spot them early enough and stop their growth.

## **Molds**

Molds don't have a specific color – the color they assume will largely depend on their age and the type of material they are growing on. The color of the mold that grows on wet abandoned clothes will be different from the color of the molds that grow on expired bread. Normally, molds can be gray, yellow, green, and black.

When you are growing mushrooms, there are different types of molds that you may find growing in your spawn jar or fruiting jar. Some of them include the following:

### **1. Blue-Green Mold**

One of the species of this type of mold is the same one that's used to create penicillin. It is named the blue-green mold because of its bluish-green color.

To correctly identify this type of mold, you will need a microscope. However, as a mushroom grower with no access to a microscope, the simplest way to identify this mold is its color. The mold will appear as a bluish-green colony on the surface of your substrate. Once you see that, then you may be battling with blue-green mold.

This type of mold doesn't grow very fast, just like many other species of fungi. Once you notice the blue-green mold growing in any jar you are using to grow your mushrooms – don't waste time before getting rid of them.

There are instances where your mushroom mycelium might outgrow and overshadow the mold colony. Don't think that this will prevent the molds from growing further and harming your mycelium.

The reason is that if you split the mycelium and use it to colonize other substrates, you will be distributing the molds to other mediums and spreading the contaminants at the same time.

### **2. Green mold**

Unlike the blue-green mold, the green mold species grow quite rapidly. Once they have colonized an area, they start to spread rapidly – this makes controlling their growth a hard task. This mold will mostly grow on the

layers of casings. They also grow on spawn jars.

This type of mold is tricky in nature, and you may have a hard time controlling it – this is because it typically appears like mycelium when it is just starting to grow. So, when you look at it, you would think it is some of your mycelium growing out.

This mold has the same color as the mycelium of most mushrooms. It is white in color – so when they grow on a surface, you will see a massive bright white colony on the surface.

When the mold begins to age, the color changes from bright white to green – hence, the name green mold. As a beginner or even advanced mushroom grower, you may have difficulty differentiating the green mold at its early stage and the mycelium of a mushroom.

So, it is best to wait until the mold has turned green, then destroy the colony. This way, you are sure you are really destroying the contaminant. Don't wait until the mold has turned full green, because, at that stage, it has started releasing its spores. The moment it starts turning green, destroy the colony immediately.

As you continue to grow in experience in mushroom cultivation, you will learn how to differentiate the young green mold from the mycelium of a mushroom. Generally, the young green mold will appear wispiest than the mushroom mycelium. The young mold will also not appear dense, especially when it is still colonizing many surface areas of the substrate.

If you don't destroy the green mold and it starts turning green or growing spores, then you will find it hard to control at that point. If the mold is growing on the inner sides of a colonizing jar, the best thing you should do if the mold has turned green is to remove the affected jar from the rest.

### **3. Cobweb Mold**

Just like the type of mold described above, the cobweb mold has the same appearance as the mycelium of a mushroom. It is interestingly one of the most prevalent contaminants that mushroom growers have to contend with. You will mostly see the cobweb mold growing on casings. Because of the color that it shares with the mycelium, exterminating it is often hard.

For early detection and control of this type of mold, you should always be observant and identify this mold by its color. Even though it has a white color, the color is somewhat grayer than that of a mycelium, which often looks pure white. Besides, its growth habit is wispiest than that of mycelium.

Another important thing to note is that it grows way faster than the mycelium of a typical mushroom. Once it has colonized a small space on the layer of a casing, the mold can grow quickly from that spot into a softball-sized mound in a few days.

If the cobweb mold finds its way near mushrooms that are just developing, it will overpower and kill the young mushrooms. Early detection and extermination is the safest way to get rid of this type of mold. Once you have identified or detected the molds, use hydrogen peroxide to suffocate them and prevent them from growing further.

#### **4. Lipstick mold**

This type of mold grows to become pinkish in color – hence, the name “Lipstick Mold.” The color of the mold makes it really easy for even a beginner to identify it, although the mold is not as popular as the other ones we have described in this subsection.

This mold will only grow on your jar if you didn’t sterilize your equipment and kits properly. Once you identify the lipstick mold, make sure you destroy their colony.

### **Disposing contaminants**

Molds are not only detrimental to the growth of your mushrooms, but they can also be detrimental to your health. As a result, it is highly important that you dispose of contaminants in the appropriate way. First, never open contaminated jars indoors – do it outdoors instead.

Opening contaminated jars indoors will make the spores of the molds to spread to different locations in your house and recolonize the new space. The scattered spores can also come in contact with sensitive utensils in your house and - in the worst case scenario - cause you health problems.

Once you notice that a spawn jar has some molds growing on its sides, take the jar outside, open it and dispose of the substrate outdoors.

After disposing of the affected substrate, change your outer clothing before going to your lab or mushroom growing area. The reason for changing your clothes is to prevent mold spores that might have stuck on the material from following you to the mushroom growing area.

Once you have discarded the substrate in the jar and you want to save the jar, a good approach would be to pressure cook the jar. This will kill the spores of the mold in the jar and prevent them from spreading out when

you open the jar. If the amount of molds that grew on the jar is too much and you don't want to pressure cook it, you can simply throw away the entire jar.

In addition to changing your clothes after disposing of contaminants, you should also wash your hands thoroughly with soap and water. This is to ensure that no mold spore follows you back into the mushroom growing area or lab.

# Chapter Seven: Using a glovebox to create a perfect growth environment

Even though you will be doing most of your work as a mushroom grower indoors where the air is generally cleaner – the truth remains that even the air indoors may not be as clean as you want. There may still be impurities that could contaminate your culture and inhibit the growth of your mycelium.

Now, a good way to create a perfect environment to grow your mushroom culture is to construct a special box that we will call “Glovebox.”

A glovebox will help to ensure that you have a cleaner or sterile environment free from external air to grow your culture.

A glovebox, also known as a flow hood, is a box specially designed to shut out external air so that impurities won't find their way into the culture you are mixing. The box has two sides that are cut open and fitted with a glove. You will have to place the culture or spawn mixture you are working on inside the box, close the lid, and stick your hands into the box through the gloves.

So, your hands are not really touching the mycelium or any other culture you are working with. You reach for the contents of the box through the gloves. Yes, the glovebox is not a perfect solution, but it is a cheap and fairly effective way of keeping contaminants away from the mycelium you want to grow.

Experts rarely have the need for a glovebox – it is mostly used by beginners. As a beginner, you will likely use a glovebox when you want to mix liquid culture, inject spores from a spore syringe into a substrate, doing grain transfer, or inoculating a substrate.

A best practice that is often recommended for beginners is that they should create their own simple glovebox. You have to do this before you start your first “real grow.” Real grow as used here means the first time you are growing a mushroom from the spores rather than using premade spawn or ready to grow kits.

If you learn to start using a glovebox early enough, it will become a part of you, and you will develop the consciousness to always grow your mycelium in a safe and sterile environment. This is not to mention that the benefits of starting the growth of your mushrooms in a glovebox free from

contaminants are just too numerous to mention.

Next, let's talk about how to create your own simple glovebox. The reason for creating your own glovebox is that you will most likely find it hard to see and purchase premade ones. So, it is better if you just create your own from available materials.

## **How to create a simple glovebox from available materials**

**Materials you need for this experiment include the following :**

- Silicon sealant
- Plastic storage bin (heavy-duty)
- A sheet of clear acrylic (about 46 \* 30cm)
- Knife
- Strong glue
- Wire coat hangers
- Loose-fitting rubber kitchen gloves
- Paper towels
- Water to bleach solution (ratio should be 10:1). This solution should be poured into a spray bottle. Alternatively, you can use isopropyl alcohol.
- Paper towels.

## **Directions:**

### **1. Create a viewing point**

You will need to always see what's happening inside the box, and since most plastic bins, especially the heavy-duty ones, are not transparent, you will need to create a viewing point. If yours is transparent and clear enough, then you don't need to make a viewing point.

To create a viewing point, mark off some parts of the bin's lid. The marked-off space should be around two inches smaller than the size of your acrylic sheet on all sides. Heat your knife and use it to cut out the marked space on the bin's lid. The essence of heating the knife is to give a neat cut and prevent the lid from cracking.

Take your silicone sealant and use it to line the inner edges of the cut area. Press your acrylic sealant firmly on the glue. Leave the setup to dry before you proceed.

## **2. Cut the holes for your arm**

The armholes are where you will fit a pair of gloves, which you will stick your hands into to do your work. To create the armholes, cut two identical circles of about 5 inches in diameter into one side of the bin. Make sure you don't place them too wide apart: you want to locate the hole such that if you stick your two hands inside the holes, they can meet comfortably inside the bin.

## **3. Create two supports for the gloves**

To do this, create two circles out of the wire coat hangers. These circles should be bigger in diameter than the armholes you made in the bin – the diameter should be around 6 inches. Take each glove and insert it through the circle you made on the wire coat hangers. Make sure you leave about 2 inches of the glove to be free. This free space will be folded around the wire.

Fold the loose end of the glove around the wire circle and secure it on the wire with a strong glue. Do the same for the second glove. Leave the setup to dry.

## **4. Seal the gloves into the armholes**

Take each glove tightly fastened to the wire circle and shove the part that is meant for the fingers into the armhole you created on the bin earlier. Attach the gloves firmly to the bin by running silicon sealant or strong glue around the space where the wire circle meets the body of the bin.

## **5. It is time to start using your glovebox**

To use your glovebox, remove the lid and place all the materials you need to commence your sterile procedure into the bin.

The items you need for the sterile procedure include your cleaning agents mixed with water in the right ratio. Once you have placed the items inside the box, close the lid and allow the box and the contents to sit for up to an hour. The essence of letting the box sit idle for an hour is to allow all contaminants to settle before you start the proper procedure.

Don't use a mixture of water and isopropyl as your sterile agent if you will also introduce flames in your sterile procedure. The reason is that isopropyl is highly flammable, and introducing flames to the same bin that

contains isopropyl may lead to an open flame or even an explosion.

## **Create an inoculation room**

After creating your own glovebox; to make sure you have a completely safe and sterile environment for your inoculation procedures, you need to create yet another room called the inoculation room. Your glovebox should always be in this inoculation room.

The best place to locate your inoculation room is a closet in your bedroom. A closet is preferred for many reasons – there is limited air movement in a closet. You can also comfortably place a small table inside the closet, then place your glovebox on the table. Besides, closets have doors so you can easily shut out external air currents that carry contaminants from getting into your inoculation area.

If you are going to use a closet as an inoculation room, you will need to remove all clothes, towels, shoes, and other clothing items from the closet. The closet will be dedicated to mushroom growing only. The reason for removing clothes and other items from the closet shouldn't be hard for you to guess – these items harbor dust and other contaminants, and you don't want that. You can also use one of the bathrooms in your house as an inoculation room – bathrooms have tiled floors instead of carpets. So, they do not harbor dust and other contaminants.

If you are using a clean bathroom as your inoculation room, you may not need to make use of gloveboxes, especially if you don't take your bath in the bathroom. In this case, you will need to dedicate the bathroom exclusively to mushroom growing only.

Another great reason why the bathroom can serve well as an inoculation room is that apart from the tiled floors, bathrooms are made with shiny hard surfaces. This means you can easily clean up the entire bathroom, and if there is any form of dirt in the bathroom, you can easily observe and clean it.

As with everything that has an advantage, using the bathroom as an inoculation room also has its own drawbacks. One of the drawbacks is that the bathroom can easily get too humid, and this can cause molds to proliferate. Because of the problem of humidity and having to deal with the growth of mold, closets are preferred to bathrooms as an inoculation room. However, if you don't have a free closet which you can use, then

you should make do with the available, which in this case might be a free bathroom.

No matter the option you choose to go with, what's really important is that you should clean up the surface properly. Use a mixture of water and a cleaning agent in the ratio of 10:1 to clean the surfaces. The preferred water-cleaning agent mixtures include water and bleach or hydrogen peroxide, Lysol, or isopropyl alcohol. If you have sanitizers, you can also spray it in the room. In this chapter, you have learned a lot about the elementary things you need to do to start growing your own mushrooms from scratch. In the next chapter, you will learn how to grow your first mushroom from scratch.

## **Chapter Eight: Growing your first mushroom from scratch**

In the previous sections, you learned how to grow mushrooms using premade spawn and ready to grow mushroom kits. In this section, we are going to take it a notch higher and talk about how to grow your first mushrooms from scratch. The method we will talk about in this chapter is straightforward, and anyone can follow it. You can use this method to grow shiitake and oyster mushrooms.

### **The PF TEK method**

The PF TEK method of growing mushrooms was discovered by a man who went by the pseudonym of **PsilocybeFanaticus (PF)**. This individual published this method first in 1995.

According to the PF TEK method of growing mushrooms, you will need to steam brown rice flour and vermiculite in a small half-pint canning jars (also referred to as PF jars, spawn jars or inoculation jars).

After steaming, allow the mixture to cool, then inject mushroom spores into the mixture, which serves as the spawn substrate.

When you steam brown rice flour and vermiculite, you will get a cake-like substance (we will be referring to this substrate as cake in many parts of this book).

Now, when you inoculate this cake-like substance with your preferred

mushroom spores, what you get is a colonized cake-like substrate. If you want to fruit the cake mycelium, you will transfer the spawn substrate or cake to small terrariums from where the mushrooms will grow out.

While's PF's methods of growing mushrooms have continued to be relevant in the world today; in 2005, he was unfortunately indicted, arrested, and prosecuted by the DEA (Drug Enforcement Agency) for growing illegal hallucinogenic mushroom varieties. Despite his prosecution, his legacies continue to live among mushroom growers and enthusiasts.

### **Why the PF TEK method is good for beginners**

Several factors make the PF TEK method the ideal method for beginners who want to grow mushrooms from scratch. One of the reasons is that the materials you need to implement this method - brown rice flour and vermiculite - can be easily found and bought in the open market.

Brown rice flour can be easily found in health food stores while vermiculite can be found in garden centers – you just need to locate a garden center near you.

Besides the ease of sourcing the materials for the spawn substrate, sterilizing the substrate needed for this procedure is also straightforward. You simply need to steam the jar containing the substrates in a pot on a stove.

Some other methods would require you to sterilize your substrate and spawn jars by using a pressure cooker. Not everyone has a pressure cooker, but almost everyone has, at least, a stove in their home. So, it is quite easy to sterilize the materials needed for the PF TEK method.

Another reason why this method is preferred is that you can inoculate the substrate with either spores or liquid culture syringes. Lastly, with the PF TEK method, you don't need a special fruiting chamber – something as small as a plastic bin will do the job.

As a beginner, you are not encouraged to prepare more than 24 PF jars – you need to start with a few jars, fruit them successfully, and scale up your operations from there. What this means is that you should go slowly and learn the ropes first. Don't try to overproduce until you have mastered the

procedures and techniques. If you start with something small that you can easily manage, you will be rewarded for it.

## **How to use the PF TEK method**

Since we have looked at the many advantages of the PF TEK method, it is time to go a step higher and look at how to use this method to grow your first set of mushrooms from scratch.

### **Materials needed for this procedure:**

- Brown rice flour
- Vermiculite (if you want to grow wood loving mushroom species, then replace this material with sawdust).
- Measuring cups
- Half-pint wide-mouth canning jars
- Water
- Paper towels
- Mixing bowls
- Cotton balls or alcohol & swabs
- Masking tape
- Hammer
- 3mm nail
- Large pot with lid (you can also use a pressure cooker if you have one)
- Aluminum foil
- Spore syringe or liquid culture syringe
- Lighter
- Bleach solution
- PF TEK formula (per jar):

- ¼ cup brown rice flour
- ¼ water
- ½ cup vermiculite or sawdust.

### **Time required for this procedure:**

- Preparing the materials will take between 30 minutes and one hour
- Sterilizing the substrate through steaming should last for about 1 hour
- Inoculation should take about 20 minutes
- Incubation should take about two week
- Dunking will take another 24 hours
- Fruiting of the mycelium will take up to 2 weeks.

### **Steps to prepare substrates for one dozen PF jars:**

**1.** Use a hammer and nail to make holes on the lids of the PF jars. You can buy PF jars on Amazon.com.

After creating the holes on the lids, clean the interior of each jar with alcohol.

**2.** Mix the substrate thoroughly

Pour the materials for the spawn substrate into a large mixing bowl and mix thoroughly. For clarification, the materials for the substrate include 3 cups of water and 6 cups of sawdust or vermiculite. Once the water and vermiculite combo has blended properly, pour 3 cups of brown rice flour into the mixture and stir properly using a spatula. Once all the materials have mixed properly, then you have gotten yourself enough spawn substrate.

**3.** Fill the PF jars

Fill each PF jar with the substrate you prepared in step 2 above. Make sure each jar doesn't get filled past the lower ring band. For clarification, the ring band is the spiral ring around the top of the jar that holds the lid in place. When filling the jars, don't press the substrate down.

After filling each jar, use a paper towel to wipe its tops – this is to remove remnants. Remember, you didn't fill the jars to the brim earlier with the vermiculite-water mixture. For the remaining top part of the jar, fill it with dry vermiculite or sawdust (if you are using sawdust). This is to serve as a barrier against contaminants that might try to get through to the substrate.

**4.** Cover the jars with their lids

Place the lid on each jar and make sure you screw it tightly. Use masking

tape to cover the nail holes you made on the lids earlier. You will need to remove this tape later (after sterilization) – so, for ease of removal, try and fold the tape over to make a small tab. To remove the tape after sterilization, you will need to pull on the tap.

## **5. Sterilize each jar**

To commence this step, you need to cover each jar with the aluminum foil. Cut out about 8'' × 8'' squares of foil for each jar. Press the square foil on each jar and use it to wrap the jars completely.

Next, pour about 5cm of water into a big pot and place the jars inside the pot. But before that, place a raised rack or some other raised material on the bottom of the pot – this is to prevent the jars from sinking in the water. Normally, the jars should be sitting on the raised rack.

After you have successfully lowered the jars in the pot, cover it and steam for about 70 minutes. If you want to use a pressure cooker for this step, then you will need to only steam the jars for about 45 minutes at 15psi (pounds per square inch).

After steaming, don't open the pot – let it sit and cool. You should only open the pot when you are ready to inoculate the jars. You should only start the inoculation process when the jars have cooled to room temperature.

## **6. Inoculate the jars (or substrate)**

After the jars have cooled to room temperature, then it is time for inoculation. This is where you are going to need your glovebox.

As you are taking out the jars from the pot, move them straight to your glovebox. As you lower each jar into the glovebox, remove the aluminum foil covering the jar. Other items you will need to place in the glovebox alongside the jars include alcohol swabs, paper towels, bleach solution, and, most importantly, your syringes.

To sterilize the glovebox, spray the bleach solution you prepared earlier on a piece of paper towel and use it to wipe clean the bottom and different sides of the glovebox. Not just the insides of the glovebox, you need to use a piece of paper towel to wipe clean all the items you have placed inside the glovebox, especially the syringes.

Before closing the glovebox, grab the syringes and shake them to ensure the liquid and the spores mix properly. Remove the plastic cap that is used to cover the needle attached to the syringe. Ignite your lighter and use the flame to sterilize the needle. This flame sterilization is one of the reasons

why you should avoid using cleaning agents that are flammable in the glovebox.

If your syringe arrived disassembled – i.e., the needle was not attached to the syringe – then you should do the assembling and flame-sterilize the needle.

The right way to flame-sterilize the needle is to hold a lit lighter under the needle and watch it until it has become red hot. After this flame-sterilization, allow the needle to cool, or you can fast track the cooling process by wiping the needle with an alcohol swab.

For each jar, grab the tab you made earlier on one end of the masking tape and pull back the tape. Use the syringe and inject  $\frac{1}{4}$  cc of fluid into each jar and cover the nail hole again with the masking tape you pulled back. Do this until you have successfully inoculated all the jars.

## 7. Incubate

After inoculating the jars, place them in a dry, warm, and dark environment and wait for the spores to colonize the substrate. If you want to fasten the inoculation process, you can make an incubator and place the jars in the incubator. You will learn how to make incubators in a subsequent section.

The incubation period should be around two weeks. After a few days of letting the jars incubate, you will start to notice the first signs of growth in the jars. However, full colonization of the substrate in the jars will occur in 2 to 3 weeks.

Normally, during the incubation period, the only typical color you should observe in the jars is white. Any other color apart from white you see in the jar is an indication that molds are growing in the jar. Mushroom mycelium is white in color, unlike molds that assume a range of colors from green to yellow, to pink, to black, to blue.

Once you see any other color apart from white in a jar, then the jar has become contaminated and must be discarded immediately.

Remember, you should never dispose of, or open a contaminated jar indoors or in the same place that you are incubating the other jars. Take the affected jar outside the house – follow the steps we discussed in the previous chapter. Remove the contaminants and sterilize the jar.

You may refer to the previous sections of this guide for more information on how to identify contaminants like molds and how to get rid of them.

## 8. Dunking

After your jars have become fully colonized, it is time to transfer them to the fruiting chamber. However, before you do that, you need to do what is called dunking – this simply involves dipping the jars in water for 24 hours before transferring them to the fruiting chamber. The purpose of this important step is to ensure the equal distribution of water in the substrate. Remember, mushrooms need water to thrive – so dipping the colonized substrate in water before commencing the fruiting procedure is a great step.

To perform the dunking procedure, you need to remove the lid of each jar. Place each jar in a sink and open the tap to fill the jar with water.

The colonized substrate in the jar will likely float in the water. So you have to force the substrate down the bottom of the jar, forcing some water out of the jar in the process, then replace the lid. Do this for all the jars.

After filling all the jars with water and replacing the lids, you will need to place the jars in the refrigerator for 24 hours to complete the dunking procedure.

## 9. Fruiting

After the dunking procedure, place your colonized jars in your fruiting chamber and wait for two weeks for the mycelium to start fruiting. You will learn how to construct your own fruiting chamber in a subsequent section of this guide.

## FAQs

People often have questions concerning the PF TEK method of growing mushrooms. In this section, we shall look at some of the frequently asked questions and their answers.

### **Substrate preparation:**

#### **1. Is it mandatory to use wide-mouth jars?**

While it is true that you can use jars that do not have a wide mouth, doing so will be counterproductive. After colonization, you will need to remove the substrate from the jars and in one piece. Using a wide-mouth jar will ensure that the substrate in the jars has enough space to slip out and not disassemble.

## **2. What type of vermiculite is the best?**

Vermiculite comes in different consistencies – some are coarse, while others are fine. While the fine ones that look almost like sand can be used for mushroom cultivation, the coarse ones often produce better results. So, you should always go for the coarse ones that have larger particles.

## **3. Can I use tap water for this procedure?**

People mostly have access to tap water, and you are fine to use it if it's what you have. However, if you think your tap water is not clean enough, then you might consider spring water. You can easily buy spring water from stores.

## **4. Will other types of grains work if I cannot find brown rice flour?**

While brown rice flour can be easily found in health food stores, you may find it hard to buy in your locality. If that happens, you can substitute it with other types of grains. For instance, you can use rye flour instead of brown rice flour.

## **5. Can I grind my own rice?**

Some people often feel it is better to grind their own rice to use for the procedure. One of the reasons is that grinding your own rice puts you in control of the process. It helps you determine the consistency. Also, some people believe that freshly ground rice does better.

The verdict is: if you have the means and you want to grind your own rice instead of buying from the stores, then go ahead and do it. To grind your own rice, you will need a coffee grinder or mill – the entire process can be tedious.

## **6. Why does my mixture get clumpy?**

If your mixture gets clumpy after mixing, then it could be that you added flour to water before vermiculite. If you add rice flour to water first and you are not consistent in stirring the mixture, you will get a clumpy mixture.

The only way to get out of such a situation is to ensure you follow the normal order, which is to add vermiculite to water. Mix thoroughly, then add brown rice flour. If you follow this order, you won't get a clumpy mixture.

### **Sterilization:**

#### **1. Should I use a pressure cooker?**

The answer to this question is YES if you have one. Even if you don't have any, endeavor to buy it. The truth is that while using steaming as a sterilization method works well, you cannot compare its success rate to the one of using a pressure cooker. If you have the means, then try as much as possible to buy a pressure cooker, even if you are just starting.

## **2. What purpose does the foil over jars serve?**

Remember, you will have to boil your jars in water – the foil simply helps to keep extra water away from the jars during the sterilization process. The foil also helps to keep the nail holes or injection points free from contamination pending when you are ready to inoculate the jars.

## **3. Is it bad for water to get into the jars during sterilization?**

The obvious answer to this question is YES. This is one of the reasons why you must place a rack at the bottom of the pot to raise the jars significantly above the water level in the pot. If water mistakenly gets into any of the jars during the sterilization process, then you must repeat the process for that particular jar from scratch. To do that, you will have to discard the substrate in the jar, wash the jar, and clean it using bleach. Then reintroduce new vermiculite, water, and brown rice mixture into the affected jar.

The reason for this is that, while mycelium needs water to grow, it will never be able to grow on a medium that has excess water. To determine if a jar has absorbed water during sterilization, you can even weight each jar before and after sterilization and cooling. If a jar is heavier than the rest, then it likely absorbed some water while in the pot. You can also simply weight each jar with your hands after cooling and so identify which jar may be heavier than the others, and so may have absorbed water.

## **4. Should I sterilize the jars for 60 minutes or more?**

If you are using a pressure cooker, then you should sterilize the jars for just 45 minutes at 15psi. However, if you are boiling the jars in water, then consider sterilizing for up to 60 minutes. At 60 minutes, every contaminant must have been destroyed. But if you feel that 60 minutes is not enough, then consider sterilizing for 90 minutes.

## **5. How high should I boil the water?**

You don't have to get the water in the pot to a high boil – a low boil will do the job perfectly as well. If you notice that steam is coming out from

the pot's lid, then the boil is good enough.

## **6. Can substrate be overcooked?**

Even if you boil or cook your substrate for more than 90 minutes, you won't have a problem. The only moment you will have a problem is if you continue to boil or cook the substrate when the water in the pot has all evaporated. Cooking substrate in a dry pot will likely lead to the burning of the substrate, and you don't want that. Other than that, it is not possible to overcook your substrate.

## **Inoculation:**

### **1. Is a glovebox required for inoculation?**

As a beginner, you might consider using a glovebox to do your inoculation – this is to reduce the chances of contamination. However, if you have perfected your skills, you may not need a glovebox, as you can simply do the inoculation in the open air.

### **2. Would adding more than ¼ cc per jar speed up the process?**

Yes, but the difference won't be significant enough. So, it is better to stick with inoculating each jar with ¼ cc of the liquid culture. This way, you will get to inoculate more jars with fewer spore syringes.

### **3. Where should I inoculate in the jar?**

It is better to direct the needle towards the glass or side of the jar – this has several advantages. One of the advantages is that you will be able to see the amount of the liquid culture that you have injected into the jar. Also, you will be able to monitor the early growth of mycelium as the growth will mostly start from the point of inoculation and spread to other areas. Additionally, you will be able to keep track of the growth of contaminants as the growth will typically start from the site of inoculation.

## **Incubation:**

### **1. My cakes started colonizing, but couldn't get completely colonized, what could have been the reason?**

The major thing that causes a cake that is already being colonized to stop along the way is the absence of fresh air. To correct this, remove one of the masking tapes used to cover the nail hole to allow the introduction of fresh air. You can also loosen a bit the lid of the affected jar.

### **2. What is the ideal temperature for my cakes?**

Most mushroom species will colonize well at around 75 degrees Fahrenheit or 24 degrees centigrade. If you don't have the right environment with this temperature range, you may need to build an incubator.

### **3. When exactly should I start the dunking process?**

You may need to wait for 2 to 3 days after full colonization of the cakes to start the dunking process. For species like Shiitake, you might need to wait for a week after full colonization to start dunking.

# Chapter Nine: Incubation and incubators

Most mushroom species don't just grow in any type of temperature – they mostly have ideal temperatures where they perform optimally. For most species, the ideal temperature range is between 70 degrees Fahrenheit and 75 degrees Fahrenheit.

If you want your mushrooms to fruit within a short period, then you should consider placing the colonized substrates in an area that has the temperature ranges mentioned above.

It is important to note that the temperature ranges that are ideal for mushroom growth are slightly higher than normal room temperature. However, if you are able to find a place in your home that is slightly higher in temperature, then you might want to place your incubation jars in that area.

If you cannot find a place in your home that is constantly dry, warm, and free from molds where you can place your incubation jars, then you might want to construct an incubator. As you can deduce, having an incubator is not compulsory.

If you build one, it simply means you will be giving your mushrooms the perfect fruiting conditions to thrive. If your gut tells you that you need it, then listen to it.

Constructing an incubator is not hard – you can source materials from stores near you and do the job yourself. In this section, we will look at how to construct a simple growth incubator from available materials.

# Making an incubator

## Materials needed:

- Zip ties
- Fish tank heater (one that is fully submersible)
- Two plastic bins (heavy-duty)
- Towel or cloth
- Water

## Procedure:

### 1. First things first

The first thing you need to do to get started is to know the tools you want to use for this experiment. One of the tools you should know well before using it is the fully submersible water heater. It is an electrical device that produces heat; hence, it must be used carefully to avoid a fire outbreak. Also, wrong handling of this tool can cause electrocution. So, for you to be safe, you need to carefully read the safety instructions on the device's label and operational manual. When getting the heater, look out for one that has a suction cup – this way, you can attach it to the surface.

### 2. Set up the heater

Insert the heater into the bin and make sure you use the suction cup to hold the heater on the surface. Next, fill the bin with water, making sure the heater is fully covered in water. Turn on the heater and allow it to heat up the water up to a few degrees above your desired colonization temperature.

### 3. Place the second bin into the first bin

Take your second bin and force it into the first one that contains the heated water. The water in the first bin will rise and stay in-between the sides of the two containers. Make sure the second bin is not hitting the bottom of the first bin. If it hits the bottom of the first bin, it will touch the heater as well, and this might melt the second bin. After forcing the second bin into the first one, use the zip ties to tie the handles of the two bins together. Then pour water in between the sides of the two containers until the water level reaches up to 6 inches. If the water level in the two bins is already up to 6 inches, you don't need to pour extra water. Next, cover the two containers with a cloth or towel.

With the incubator above, all you need is to place your inoculation jars in

the second bin. If you need to adjust the temperature at any time, do so by simply turning on the heater.

## **Contamination in jars**

The primary reason why mushroom cultivation fails in most cases is due to the presence of contaminants such as molds. Once your spawn substrate becomes contaminated, it will be hard for your mushrooms to grow.

The reason for this shouldn't be hard for you to guess – the contaminants will be competing with your mushrooms for nutrients.

Most times, contamination occurs during the incubation period – and it is not something you should treat carelessly.

If a jar is colonizing and you notice a color on the substrate which is different from white, then there is a high chance that the substrate has been contaminated, and you must take action immediately.

When a jar is thus contaminated, do not try to save the substrate in the jar – that will be counter-productive. You have two options when it comes to dealing with contaminants.

The first option is to discard the entire jar that is contaminated without opening it. It is very risky to open a jar that has a large amount of molds growing inside it.

Doing so will spread the spores of the mold and lead to the possible contamination of the other jars. So, if you have large amounts of molds growing in a jar, it is always better to discard the entire jar with the substrate in it without opening the jar. As you continue to hone your mushroom cultivation skills, it will become easier for you to identify contaminants before they grow too large.

When you discover contaminants early enough, you may be able to save the affected jar but not the substrate. No matter how much you try, you can never save the substrate in a contaminated jar. You can only save the jar if you act early enough, and this brings us to the second option when it comes to dealing with contaminants.

The second option is to identify the contaminants early enough and try to salvage the contaminated jar. You will need to take the affected jar outdoors, open it, and discard the substrate in it. Direct water from a high speed hose into the jar and wash it properly.

It is likely that a large puff of spores will come out of the jar and get blown

into the environment. This large puff of spores will look like smoke and can be blown to the direction of your clothes. If this happens, remove your clothes immediately and wash your hands thoroughly before going back inside. Otherwise, you will be going back into the cultivation area with an army of contaminants that will likely affect the other jars.

If a jar is contaminated, you will need to dispose the entire jar without opening it, especially if the molds have grown so large.

## **Dunking**

Even though we have talked a bit about dunking earlier – in this section, we will take an in-depth look at dunking.

Dunking involves dipping colonized jars in water for up to 24 hours to enable proper water circulation in the jars. You will usually do dunking before finally placing the colonized jars in your incubator or fruiting chamber as the case may be.

Mushrooms need moisture to grow, and dunking helps to introduce a fresh influx of water that will enable the colonized jars to fruit properly.

Dunking is important because, as your substrate was being colonized over the past two weeks, most of the moisture in the substrate got absorbed by the developing mycelium. Some of the water mass in the substrate also evaporated into the air.

The mycelium that has colonized the substrate will need all available water to grow into full mushrooms. So a substrate that is well hydrated will do well to aid the proper growth of your mushrooms.

Remember, the greater parts of mushrooms are mainly water – about 90 percent of the mushroom is water. Such a substance will definitely need a lot of water while growing.

The dunking process is very easy – you must ensure that you submerge the entire jar containing the colonized substrate in water. This has to last for twenty-four hours – and you must ensure that the cakes in the jar have been fully colonized before dunking.

To identify a fully colonized substrate is easy – you just need to observe the color of the substrate in the jar. If all the parts of the substrate have white color, then it has been completely colonized. If you open a jar and realize all the parts of the substrate in the jar have not been completely colonized, you either wait for full colonization to occur, or you simply wash off the parts that have not been colonized using water.

Don't dunk a cake that has not been fully colonized – the reason for this is that the parts that are not colonized will likely grow molds and affect your yield.

Once you are sure that all the parts of the cake in the jars are fully colonized, then it is time to commence the dunking process. You may use tap water for this or spring water. Most people use normal tap water.

To start the process, open each jar and fill the substrate with water – let the water pass through the dry vermiculite that was used to cover the cake earlier.

Keep pouring water into each jar until the substrate cake in it begins to float. It is normal for the cake not to float probably because it has attached itself to the bottom or sides of the jar. The important thing is that you should fill each jar with water and replace the lid.

After filling the jars with water, place them in a refrigerator for 24 hours. Leaving the jars in the refrigerator helps to serve two purposes – one, it is a way to signal the mycelium mass in the jars that it is time to start fruiting. For most mushroom species, a little drop in temperature signals the mycelium that it is time to start fruiting.

Another reason to leave the dunked cakes in the refrigerator is to kill contaminants – molds and other contaminants find it hard to grow in cold temperatures. So, if any contaminants got into the jars when you opened them to pour water, the low temperature in the refrigerator will ensure they do not grow.

## **Double-end casing**

This is an optional procedure that you might want to consider after dunking your colonized cakes. Double-end casing has to do with placing a nutrient-free material on a colonized and dunked substrate – the major aim is to encourage water retention.

Most commercial mushroom cultivators use peat moss as the nutrient-free layer for this procedure. As a home grower, you can use the normal wet vermiculite as the double layer. You will need to pour the vermiculite on the bottom of the jars and use it to also fill the sides of the jar that are free.

This procedure will work together with dunking to ensure your substrate sustains enough fluid needed by the mushrooms throughout the fruiting period. You can perform the procedure in your normal workspace with or

without gloves.

After double-end casing has been performed, you can then place the jars in the fruiting chamber.

### **Sterilizing vermiculite for double-end casing**

In most cases, you may not need to sterilize the vermiculite you will need for the double-end casing procedure, especially if you just took it directly from the bag. However, if the bag of vermiculite has been open for a while, you may need to carry out some form of sterilization.

To sterilize the vermiculite, microwave it for about 5 minutes. Vermiculite gets hot really fast – this means it will melt plastic plates easily. So, don't use plastic bowls for microwaving the vermiculite, use a glass bowl instead.

Also, if you microwave vermiculite when it is wet, you will have to wait for many minutes for it to cool. It is better to microwave it when it is dry.

### **How to do double-end casing**

**Materials needed for this include the following :**

- Many cups of dry vermiculite
- The fully colonized cakes
- Spoon
- Water

#### **Directions:**

##### **1. Prepare the vermiculite**

Take out several cups of vermiculite and microwave it using a glass bowl. After the vermiculite has cooled, pour it into a rubber bowl, and add some water to it. Make sure you don't allow it to soak excessively, or you will have to press out the excess water with your hands.

Remove the lid of one jar and place it upside down on the counter – i.e., the top of the lid should sit on the counter. The jar's lid will later serve as the base of your mushroom cakes in the fruiting chamber. Use a spoon to scoop some of the sterile moistened vermiculite into the lid placed on the counter until the lid is filled.

##### **2. Remove cake from the jar**

Carefully remove the colonized cake from the jar without dismantling it. If the cakes have stuck to the sides of the jar, hit the jar lightly on the counter to free the cake from the jar.

Also, remove the vermiculite used to cover the top of the colonized cake. If any mycelium is sticking to the vermiculite on top, remove the mycelium together with the vermiculite. You have to be careful while doing all these to ensure you don't dismantle the cake.

### 3. Set the cake on the fresh layer of vermiculite

After removing the cake from the jar, place it upside down on the fresh layer of vermiculite on the jar's lid. Grab some more spoons of the wet, sterile vermiculite in the bowl and place it on top of the cake.

### 4. Stack the jars if you want

You may want to stack the cakes. To do that, simply remove another cake from its jar and place it on top of another. Then cover the top of the second cake with some wet vermiculite from the sterile bowl. After this procedure, you are finally ready to transfer the cakes to the fruiting chamber or incubator.

## **The fruiting process**

Once your substrate cakes have been fully colonized, dunked, and you have performed the optional, yet important double-end casing, then it is time to place the colonized cakes in a fruiting chamber for the mycelium to grow into mushrooms.

Remember, mushrooms only thrive or grow under certain conditions – a fruiting chamber will provide all these needed conditions for your mycelium to grow into mushrooms. A fruiting chamber will provide the right temperature, humidity, and light for your mushrooms to grow

### **Different types of fruiting chambers**

You have many choices when it comes to fruiting chambers – there are the small, moderate ones for small guys like you and the huge ones for commercial cultivation.

While you can prepare a fruiting chamber yourself, you can also purchase one that is premade. Premade ones come in various sizes, varieties, designs, and cost differently as well. If you are considering premade ones, it is important that you overlook the fancy ones and just go for one that has

the basic functionalities you want.

Additionally, if you are making your own fruiting chamber, endeavor not to introduce so many variables. Simple setups will minimize the risk of failure.

Let's proceed to look at the variables you should consider in a fruiting chamber. Remember, all our discussions in this chapter are focused on growing mushrooms using the PF TEK method.

## **Things to consider in a fruiting chamber**

There are four things you have to consider when choosing a fruiting chamber, and they include size, humidity, fresh air, and light. Let's proceed to look at each of these variables.

### **Size**

When choosing a fruiting chamber, you have to be careful to select one that will contain all the cakes you have prepared. If you stack two PF jars on top of each other, they will still fruit. What this means is that if you have twelve jars, you can select a fruiting chamber that has enough space to hold the lids of 6 PF jars. The height of the chamber should be enough to hold two or three PF jars stacked on each other when the lid is in place. Also, you should consider that perlite (you will know what this means later) will be placed on the bottom of the chamber.

So, the height of the chamber has to be enough to contain the perlite that will be on the bottom and two or three cakes stacked on each other.

Also, another reason why you should take size seriously is because of CO<sub>2</sub> or carbon dioxide. When mycelium is turning to mushrooms, the process releases CO<sub>2</sub> into the environment. If the fruiting chamber is small, the CO<sub>2</sub> being released will fill up the chamber in no time. Too much CO<sub>2</sub> in a small enclosed space will inhibit the growth of your mushrooms. If you want to use a small chamber, then you must be ready to use a fan to dissipate the CO<sub>2</sub> that might build up in the chamber.

### **Humidity**

In addition to a warm temperature, mushrooms also need a humid environment to grow. This is the reason why mushrooms that grow in the wild mostly fruit after it rains. Considering how important humidity is to the growth of your mushrooms, it should be one of the first things you

must consider before choosing a fruiting chamber.

One of the easiest ways to maintain constant humidity in a fruiting chamber is to introduce perlite into the chamber – this works well for small scale cultivation.

### **What is perlite?**

Perlites are small rocky materials, often white in color that are usually mined from the earth. Perlites have hollow interiors – so when you moisten the rocks, they can hold water for a significant period of time, which they will gradually release into the environment through evaporation.

When you pour moistened perlite rocks into a fruiting chamber, they will be releasing their moisture gradually, thus helping to maintain constant humidity in the chamber. You can purchase perlite rocks from your favorite garden center or on Amazon.

To use perlite, soak them in water and then use them to fill the bottom of your fruiting chamber. The height of the perlite rocks on the bottom of the fruiting chamber should be around 2 to 3 inches.

This amount of perlite rocks in the chamber will help to maintain humidity in the chamber for up to 3 weeks or throughout the fruiting period of the cakes.

In addition to helping to maintain humidity, perlites do not contain many nutrients. So, molds won't grow on them.

### **Air bubbler**

An air bubbler will work hand in hand with the perlite rocks at the bottom of the fruiting chamber to provide the humidity for the growth of your mushrooms. The air bubbler ensemble will consist of a fish tank pump – this will be plugged into the wall socket outside the chamber. An air bubbler attached to the fish tank pump will be placed in a glass of water placed under the perlite mass at the bottom of the chamber.

When the fish tank pump is powered on, the bubbler attached to the glass of water blows wet bubbles into the perlite mass. This will ensure that there is a constant supply of fresh water to the perlite, which is then dissipated into the chamber through evaporation. The bubbler also does a good job of blowing fresh air into the chamber – so it serves a double purpose.

The part of an air bubbler that has a plug goes to the mains supply while the other cord goes into the glass cup in the chamber.

## **Use a spray bottle for freshwater supply**

In addition to using an air bubbler to supply fresh air to the chamber, you can also use a soft spraying spray bottle to supply water to the chamber. Don't go for spray bottles that spray strong water jets into the chamber – go for those that spray a fine mist.

Ideally, you should use the spray water to moist the fruiting chamber two to three times daily. Make sure you direct the mist at the bottom of the chamber or perlite. Do not spray fruiting cakes or young mushrooms directly. Apart from misting the perlite at the bottom of the chamber, you can also target the sides of the chamber if they are dry.

## **Humidity levels**

With the right combination of perlite rocks, air bubbler, and a spray bottle, you will be able to maintain the right humidity in the chamber for the growth of your mushrooms. Since you are using the PF TEK method, the humidity inside your fruiting chamber should be above 90%.

If you have a humidity gauge (you can purchase it from large garden centers), you can use it to measure the level of humidity in the chamber. However, with the right use of perlite rocks, spray bottle, and air bubbler, the humidity in your chamber should be above the recommended percentage, and you may not need a measuring tool.

## **Fresh air**

Another important variable you must consider when building your fruiting chamber is the presence of fresh air. As mentioned earlier, when mycelium starts developing into mushrooms, the process releases a lot of CO<sub>2</sub>. This large concentration of CO<sub>2</sub> in a small enclosed space can inhibit the growth of mushrooms.

If there is a high concentration of CO<sub>2</sub> in your fruiting chamber, your mushrooms will show stunted growth, have thin elongated stems, and caps that are not properly developed.

The easiest way to reduce the concentration of CO<sub>2</sub> in your fruiting

chamber is to use a manual hand fan made of cardboard to blow fresh air into the chamber two to three times daily.

The lid of your fruiting chamber can also work as a hand fan. You don't need to fan the chamber vigorously – mild fanning of fresh air into the chamber for 5 to 10 seconds, two or three times daily will do the magic for you.

If you have a large fruiting chamber, fanning the chamber two times a day should be enough. However, a smaller fruiting chamber will mean that you will have to fan the chamber for up to 5 times daily. This is one of the reasons why you should consider a bigger fruiting chamber.

## **Light**

Even though mushrooms cannot be categorized as plants, they still need light to initiate the first stage of growth up to the fruiting stage. Almost all species of mushrooms need light apart from the White Button species that require a dark place to grow. This is one of the reasons why home growers rarely grow the White Button mushroom.

Just like plants, mushrooms grow towards the direction of the source of light. This means that the best place to locate the source of light to your mushrooms is the top of the fruiting chamber.

You would want to use a fruiting chamber with a clear top and opaque sides. This will ensure that the light comes in through the top to enable your mushrooms to grow upwards instead of sideways.

The intensity of the light doesn't matter – it should be bright enough. Mushrooms are not like plants that need intense light to manufacture their own food. Mushrooms get their food by decomposing the nutrients on the medium or substrate they grow on.

If your fruiting chamber is holding up to 12 fruiting cakes or jars, then you can easily light up the area with a 40-watt bulb. You can hang the bulb just above the chamber.

If the room that you use as your work area is properly lit, then you may not need an extra source of light. You can depend on the ambient sunlight getting into the room.

Most mushroom species will grow well with just 12 hours of light exposure daily. This is independent of the source of the light – whether sunlight or artificial. Now, when you are choosing a fruiting chamber, you have to consider one that has a transparent top and opaque sides.

The above are the four variables you must consider when choosing a fruiting chamber. The right fruiting chamber will come in the right size, provide the right humidity, fresh air, and light for the growth of your mushrooms. Once you get these parameters right, then your mushrooms will have no fruiting problems.

After preparing your fruiting chamber, it is time to place your colonized and dunked cakes in the chamber, provide the right fruiting conditions and wait for your cakes to start fruiting. After fruiting, the next stage is the harvest.

## **Harvest**

After fruiting, the next stage in mushroom cultivation using the PF TEK method is the harvest. This is arguably the most exciting aspect of mushroom cultivation – because it is when you get to see the “fruits” of your hard labor.

Various species of mushrooms have different ways of showing they are ready for harvest. For most mushroom species that have a cap, stem, and gill, you will know that the mushroom is ready for harvest when you can visibly see the gill under the cap.

When a mushroom is ready for harvest, it stops growing, and if not harvested, it might start losing moisture. For some other mushroom species, when they are ready for harvest, you will notice that the cap will start to change color from white to brown.

To harvest your mushroom, simply grab the stem of the mushroom around the base area and twist it with your finger. This will cut the mushroom away from the substrate. Alternatively, you can use scissors to cut the stem from the base area.

You don't have to harvest all your mushrooms at once – because they may not mature all at once. You can keep harvesting as they mature. If your mushrooms form as a cluster, you don't have to harvest part of the cluster and leave the rest – even if some of the clusters may not be mature yet. The ideal thing to do is to harvest the whole cluster at once.

## **Aborts**

Often, you will notice that some mushrooms start growing well and then suddenly start to experience stunted growth – this is quite normal in mushrooms. Such mushrooms that normally fail to grow to maturity are referred to as aborts. After harvesting the fully developed mushrooms, don't leave the aborts behind. Harvest, dry, and save them. You can turn dried and saved aborts into mushroom powder for soup stocks.

Change in fruiting conditions like humidity, temperature, and light are some of the reasons why a hitherto growing mushroom may abort. This is one of the reasons why you should maintain consistency when your mushrooms are already fruiting.

Additionally, touching pins or young mushrooms with your hands or any other object might make the mushrooms abort. Another thing that might cause mushrooms to abort is spraying water on them directly.

It is common for some of your mushrooms to abort – it is perfectly normal. However, you should feel concerned if many of your mushrooms abort at the same time. In that case, you should look out for the cause and fix it.

After harvesting all the grown mushrooms, you will need to dunk the substrate again and prepare it for the second flush. Submerge the substrate or cakes in cool water for twelve to twenty-four hours. This action will moisturize your substrate afresh and prepare them for the next set of mushrooms.

After dunking, prepare your fruiting chamber and ensure it has all the right fruiting conditions. Next, introduce the dunked cakes into the fruiting chamber and wait for the substrate to start fruiting for the second time.

## **Drying mushrooms**

After harvesting your mushrooms, you may need to store or save them for later use. You can dry or refrigerate your mushrooms for later use.

Remember, mushrooms have high water content – so if you don't take steps to preserve them, they will start decomposing after a few days.

If you want your mushrooms to stay fresh, then refrigerating them should be your best bet. Refrigerated mushrooms can last for up to a week or even more without you taking further action. If you have to store your mushrooms, you must use paper bags instead of plastic ones.

Mushrooms need good air circulation to stay fresh. Using plastic bags will restrict air movement to the mushrooms and cause them to decompose faster.

Refrigerating mushrooms is only recommended if you will use them a week after harvest. If you need to keep the harvested mushrooms for a period longer than a week, then you need to dry them.

Various ways of drying mushrooms abound – the easiest one is fan drying. In fan drying, you place the harvest mushrooms in front of a fan for one or two days. Using this method will get your mushrooms very dry. However, there is a downside – if little moisture is left in the dried mushrooms and you store them that way, molds may grow on the mushroom.

After drying, if you want to store the dried mushrooms in a sealed container, you will need to add a desiccant to the container. A desiccant is a substance that removes moisture from the air.

Storing your mushrooms together with a desiccant will produce cracker-dry mushrooms that will last for a very long time.

If you use fan-drying, it is recommended that you also use a desiccant to complete the drying process. You can find desiccants in supermarkets and large stores – they usually come under different brand names. The same way you create fruiting chambers to fruit your mushrooms, you can also create a desiccant chamber for storing your mushrooms.

Well dried and preserved mushrooms will retain their taste, flavor, and quality for many years. So, you shouldn't bother about losing the taste, flavor, or quality of your mushrooms due to drying and storage.



The image above shows well-dried shiitake mushrooms. These dried mushrooms can stay for years without losing taste, flavor, or quality.

## **How to construct your own desiccant chamber**

As mentioned earlier, if you need to store your dried mushrooms for a period longer than a week, then you will need to get your own desiccant chamber. In this section, we will look at how to construct one.

### **Materials needed :**

- Silica gel or any other type of desiccant such as DampRid
- Large plastic bin with a lid that is tight-fitting. You will need to fit screws at four strategic points on this bin.
- Two pieces of metal screening mesh. This can be any size, and you will need to cut it to fit inside the plastic bin.
- Paper towels

### **Directions:**

#### **1. Fan dry your mushrooms**

Fan dry your mushrooms for up to two days. This will reduce the moisture content of the mushroom drastically. Fan drying will also help the desiccant to remove the remaining moisture in the mushrooms effectively.

#### **2. Set up the first level using the metal screening mesh**

You will need to use two of the metal screening mesh to create two levels in your plastic bin. The first level will hold the desiccant while the second

level (which is the upper one) will hold the dried mushrooms. To create the first level, place one of the metal screening meshes some inches above the bottom of the bin. Use some screws to hold the mesh in place.

Use your paper towel to cover the mesh that has formed the first level and then place the desiccant on the towels.

### 3. Create the upper or second level

Use the second screening mesh to create a second level in the bin. Use the same technique you used in creating the first one.

This second level should be a few inches above the first one. For this second level, you don't need paper towels – place the dried mushrooms directly on the mesh. Make sure you use some screws to hold the second or upper level in place.

After placing the dried mushrooms on the second level, shut the lid of the bin tightly and watch as the mushrooms become cracker dry. You can then remove the dried mushrooms from the chamber and store them in paper bags until you are ready to use them.

In this chapter, we have been talking about growing mushrooms from scratch using the PF TEK method. In the next chapter, we will look at working with sawdust.

# Chapter Ten: Working with sawdust

Most mushrooms species such as Reishi, Maitake, Lion's Mane, Shiitake, etc. can grow on dead wood. This is why you can easily find them growing in the wild. If you want to grow these mentioned species, you can replicate the same conditions that the dead wood or logs offer them to allow them to grow.

You can do this by creating a substrate that has the same fruiting conditions as deadwood – one of the easiest ways to do is by using sawdust as your fruiting substrate.

To use sawdust as your fruiting substrate, you will need to pour some sawdust into a spawn bag, then add some grain spawn (you can purchase grain spawn of your choice from Amazon). The grain spawn will help to colonize the sawdust. You can also work with direct sawdust spawn, so there's no need for initial colonization.

As a home grower, there are two ways you can use sawdust to grow mushrooms. The first method is by using sawdust spawn while the second option involves using sawdust production blocks. We will look at what each method entails shortly.

## Sawdust spawn

Mushroom spawn, as you have seen in the previous section, is a mushroom substrate that you colonize with your favorite mushroom species. After the first colonization, you can use the substrate to colonize yet another substrate before you fruit all the colonized substrates. The major aim of using a spawn substrate is to increase the size of the grown mycelial mass.

With sawdust spawn, you colonize some sawdust sample, then use it to colonize more substrates. When you transfer mycelium from one substrate to another, the mycelium, first of all, has to adapt to the type of nutrients available on the new substrate. After this short period of acclimatization, the mycelium picks up speed and starts growing rapidly.

Now, one of the advantages of using sawdust spawn is that it encourages the fast growth of mycelium. Since the mycelium will be transferred from sawdust spawn to sawdust production block, the mycelium being grown won't have a tough time trying to adapt to the conditions of the new substrate before commencing growth.

## **Different types of sawdust**

Most edible mushrooms species will grow on sawdust derived from various hardwood species. As mentioned earlier, the oak tree remains the favorite log for growing mushrooms. In the same vein, sawdust from oak trees also performs wonders.

If you are growing mushroom species that love hardwoods, then consider sawdust from various types of oak, such as chinkapin oak, white oak, chestnut oak, red oak, black oak, etc. If you cannot find oak sawdust, you can work with other types of hardwoods.

Oak sawdust will take a longer time to decompose, and you can use it to fruit mushrooms for a longer period. However, if you want to get your mushrooms faster, then consider sawdust from softer hardwood species such as the tulip poplar. Such softer hardwood species will decompose faster than oak – meaning you will have a shorter time between colonization of the substrate and fruiting.

When sourcing sawdust for your mushroom cultivation, endeavor to find those that are more finely textured. The coarse ones will not give better results. However, you should also avoid sawdust that is too fine.

## **Sources of sawdust**

Where can I find sawdust? While you can find sawdust by just walking into a carpenter's workshop, the major problem is finding good usable sawdust.

Another problem involves finding a consistent source of good sawdust. People often think sawdust is useless and worthless, but you will understand it is worth it when you want it for something important.

That being said, you can purchase good sawdust from modern sawmills – some of these sawmills deliberately prepare the sawdust as bedding for hogs, horses, and cattle. You can purchase this same sawdust and use it to grow your mushrooms.

If you live in some places where there are forests (both public and private) that get logged regularly, you can ask the loggers to sell the sawdust to you. If you are just looking for a small quantity, some of the loggers will gladly fill a plastic tote bag free of charge for you. Even if you want a larger quantity, you may be lucky to find some sawmills that will give sawdust for free.

When you are just starting, you can source your sawdust from the local

loggers – however, you may not get the sawdust that meets your size requirement. Buying from established sawmills will give you a chance to dictate the size of the sawdust you want. No matter where you are getting your sawdusts from, make sure you don't go for the ones that are too fine or too coarse.

## **Spawn bags**

After sourcing sawdust, you will need to pour them into spawn bags – it is inside this spawn bags that you will colonize the sawdust and fruit your mushrooms.

You must have come across the term “spawn bag” in this book several times without knowing what it means. Well, a spawn bag is a polypropylene bag that usually has its sides gusseted. The bag is also sealed on all sides with a filter patch attached to one of the sides for the passage of air in and out of the bag.

You can purchase spawn bags online or from a garden center near you. Using such a bag is an easy, cheap, and efficient way to colonize a large amount of substrate. Apart from generating sawdust spawn, you can also use spawn bags to generate other types of spawn like grain spawn.

Some spawn bags are up to 18 inches long, while others are up to 4 inches long. Your choice of the size of the spawn bag should be dependent on the amount of sawdust you want to colonize. You can use big bags because that's what most professional growers use.

Another thing that may be different in spawn bags from various manufacturers is the type of material used for the filter. Some filters on some spawn bags allow different sizes of particles to pass through.

## **Sealing your spawn bags**

After preparing your sawdust, you will need to introduce some mushrooms spores into the sawdust. Next, you will have to pour the prepared sawdust into your spawn bag and seal the bag. Since spawn bags are made of polypropylene, you can easily seal the edges through the application of heat.

If you don't have an industrial sealing machine; you can seal the bag by using an electric iron. Yes, an electric iron will work just fine.

After filling the spawn bag with your prepared sawdust spawn, fold the top of the bag. Then plug your electric iron and set the heat to medium or high

— place pieces of paper on both sides of the folded spawn bag. Alternatively, use a newspaper to cover the folded side of the bag.

Once your electric iron has become hot, place it on the paper. Press the iron on the newspaper that is covering the folded end of the spawn bag. Move the iron the same way you would move it if you were ironing your clothes.

If you do this well, then your spawn bag should be sealed without air holes or spaces.

## **How to create your own sawdust spawn**

### **Materials needed for this procedure include:**

- Water
- Sawdust (19 liters bucket – this will fill up four big spawn bags).
- Scale
- Measuring bucket or bowl
- Clothespins
- Spawn bags
- Glovebox
- Pressure cooker

You will spend up to 30 minutes to prepare all the materials and another 3 hours for sterilization using a pressure cooker.

### **Directions:**

#### 1. Weight the sawdust

It is important for you to know the weight of the sawdust you want to use in preparing your spawn. To get this step right, you have to weigh the empty bucket holding the sawdust first.

After that, pour the sawdust into the bucket and weigh the two. Now, subtract the weight of the bucket from the weight of the bucket & sawdust. What you get is the weight of your sawdust. Normally, a 5-gallon bucket should contain up to 4kg or 9lbs of sawdust.

#### 2. Moisten the sawdust

Pour water into the bucket containing the sawdust. You will need to bring the sawdust to have a water content of up to 60%. This means that if your

sawdust weight 9lbs, you will need to pour up to 3 lbs of water into the bucket.

After doing this for the first time, engrave a mark on the bucket to indicate the water level after you have poured water and sawdust into the bucket. This will save you time and help you avoid the stress of using a measuring scale each time you want to carry out this step.

After pouring the water, allow the sawdust to soak in the water. You can achieve this by allowing the sawdust/water mixture to stay idle for 30 minutes to 1 hour.

### 3. Fill the spawn bags

Pick a spawn bag and fill it with up to 5lbs of moistened sawdust. While doing so, make sure you let out air from the bag. Don't allow entrapped air in the bag. After filling the bag, fold the top over about three or four times. Then use some clothespins to hold the folded top in place.

### 4. Sterilize the bag in a pressure pot

Place the spawn bag in a pressure pot and cook for up to 3 hours. If you are using a small spawn bag that holds less than 5 lbs of sawdust, you can pressure cook the bag for up to 2 hours instead of three. After cooking, allow the sawdust to cool.

After cooling, transfer the sawdust into a glovebox. While in the glovebox, introduce a colonized quart jar of grain spawn (you can purchase grain spawn on Amazon). Once the sawdust has become fully colonized, introduce fruiting conditions, and grow your mushrooms.

# Final words

Growing mushrooms is an art, and like every art, you will get better with practice. It is good that you have read this book to this point. You shouldn't just read it once like a romance piece. This is an instructional piece, and you should always refer to the various chapters when needed.

The best way to start growing mushrooms is by using ready-to-grow kits, which you can buy online. Once you have learned the easier techniques, you may graduate to using premade spawn. After using premade spawn for a while, proceed to start growing your own mushrooms from scratch.

Note: you are going to make mistakes – your mycelium will likely not fruit as expected. Your culture will likely get contaminated. However, you should never let drawbacks stop you. See drawbacks as stepping stones. Learn from your mistakes and try again.

I wish you all the best in your mushroom cultivation adventure!

# MAGIC MUSHROOMS

## Psilocybin mushroom

### History

Psilocybin mushrooms, also known as psychedelic mushrooms, are mushrooms that contain the psychedelic compounds psilocybin and psilocin. Common colloquial terms include magic mushrooms and 'shrooms. It is used mainly as an entheogen and recreational drug whose effects can include euphoria, altered thinking processes, closed and open-eye visuals, synesthesia, an altered sense of time and spiritual experiences. Biological genera containing psilocybin mushrooms include *Copelandia*, *Galerina*, *Gymnopilus*, *Inocybe*, *Mycena*, *Panaeolus*, *Pholiotina*, *Pluteus*, and *Psilocybe*. Over 100 species are classified in the genus *Psilocybe*. Psilocybin mushrooms have likely been used since prehistoric times and may have been depicted in rock art and pre-Columbian historical materials in Mesoamerica. Many cultures have used these mushrooms in religious rites. In modern societies, they are used for spiritual reasons, and recreationally for their mood lifting and psychedelic effects.

Archaeological evidence indicates the use of psilocybin containing mushrooms since ancient times. Several mesolithic rock paintings from Tassili n'Ajjer (a prehistoric North African site identified with the Capsian culture) have been identified by author John S. Ashley as possibly depicting the shamanic use of mushrooms, possibly *Psilocybe*. Hallucinogenic species of the *psilocybe* genus have a history of use among the native peoples of Mesoamerica for religious communion, divination, and healing, from pre-Columbian times to the present day. Mushroom stones and motifs have been found in Guatemala.

A statuette dating from ca. 200 AD and depicting a mushroom strongly resembling *Psilocybe mexicana* was found in a west Mexican shaft and chamber tomb in the state of Colima. A *Psilocybe* species was known to the Aztecs as *teonanácatl* (literally “divine mushroom” – agglutinative form of *teó* (god, sacred) and *nanácatl* (mushroom) in Náhuatl) and were reportedly served at the coronation of the Aztec ruler Moctezuma II in 1502. Aztecs and Mazatecs referred to psilocybin mushrooms as genius mushrooms, divinatory mushrooms, and wondrous mushrooms, when translated into English. Bernardino de Sahagún reported ritualistic use of *teonanácatl* by the Aztecs, when he traveled to Central America after the expedition of Hernán Cortés. After the Spanish conquest, Catholic missionaries campaigned against the cultural tradition of the Aztecs dismissing the Aztecs as idolaters; the use of hallucinogenic plants and mushrooms, like other pre-Christian traditions, were quickly suppressed.[3] The Spanish believed the mushroom allowed the Aztecs and others to communicate with devils. In converting people to Catholicism, the Spanish pushed for a switch from *teonanácatl* to the Catholic sacrament of the Eucharist. Despite this history, in some remote areas, the use of *teonanácatl* has remained.

At present, psilocybin mushroom use has been reported among some groups spanning from central Mexico to Oaxaca, including groups of Nahuatl, Mixtecs, Mixe, Mazatecs, Zapotecs, and others. An important figure of mushroom usage in Mexico was María Sabina.

Psilocybin is present in varying concentrations in about 200 species of Basidiomycota mushrooms. In a 2000 review on the worldwide distribution of psilocybin mushrooms, Gastón Guzmán and colleagues considered these to be distributed amongst the following genera: *Psilocybe* (116 species), *Gymnopilus* (14), *Panaeolus* (13), *Copelandia* (12), *Hypholoma* (6), *Pluteus* (6) *Inocybe* (6), *Conocybe* (4), *Panaeolina* (4), *Gerronema* (2), *Agrocybe* (1), *Galerina* (1) and *Mycena* (1).[14]

Guzmán increased his estimate of the number of psilocybin - containing *Psilocybe* to 144 species in a 2005 review.

Many of these are found in Mexico (53 species), with the remainder distributed in the US and Canada (22), Europe (16), Asia (15), Africa (4), and Australia and associated islands (19). In general, psilocybin-containing species are dark-spored, gilled mushrooms that grow in meadows and woods of the subtropics and tropics, usually in soils rich in humus and plant debris. Psilocybin mushrooms occur on all continents, but the majority of species are found in subtropical humid forests. *Psilocybe* species commonly found in the tropics include *P. cubensis* and *P. subcubensis*. *P. semilanceata*— considered by Guzmán to be the world's most widely distributed psilocybin mushroom—is found in Europe, North America, Asia, South America, Australia and New Zealand, but is entirely absent from Mexico.

## The effects

The effects of psilocybin mushrooms come from psilocybin and psilocin. When psilocybin is ingested, it is broken down to produce psilocin, which is responsible for the psychedelic effects. Psilocybin and psilocin create short-term increases in tolerance of users, thus making it difficult to abuse them because the more often they are taken within a short period of time, the weaker the resultant effects are. Psilocybin mushrooms have not been known to cause physical or psychological dependence (addiction).

Poisonous (sometimes lethal) wild-picked mushrooms can be mistaken for psilocybin mushrooms. Poisonous mushrooms can look very similar to certain psilocybin containing mushrooms, and extreme care is advised when picking them outdoors.

As with many psychedelic substances, the effects of psychedelic mushrooms are subjective and can vary considerably among individual users. The mind-altering effects of psilocybin-containing mushrooms typically last from three to eight hours depending on dosage, preparation method, and personal metabolism. The first 3–4 hours of the trip are typically referred to as the 'peak' in which the user experiences more vivid visuals, and distortions in reality. However, the effects can seem to last much longer to the user because of psilocybin's ability to alter time perception.

In internet surveys, some psilocybin users have reported symptoms of hallucinogen persisting perception disorder, although this is uncommon and a causal connection with psilocybin use is unclear. There is a case report of perceptual disturbances and panic disorder beginning after using psilocybin mushrooms in frequent cannabis users with a pre-existing history of derealization and anxiety.

Magic mushrooms were rated as causing some of the least damage in the UK compared to other recreational drugs by experts in a study by the Independent Scientific Committee on Drugs. Other researchers have said that psilocybin is “remarkably non-toxic to the body's organ systems”, explaining that the risks are indirect: higher dosages are more likely to cause fear and may result in dangerous behavior.

One study found the most desirable results may come from starting with very low doses first, and trying slightly higher doses over months. The researchers explain the peak experiences occur at quantities only slightly lower than a sort of anxiety threshold. Although risks of experiencing fear

and anxiety increased somewhat consistently along with dosage and overall quality of experience, at dosages exceeding the individual's threshold, there was suddenly greater increases in anxiety than before. In other words, after finding the optimum dose, returns diminish for using more (since risks of anxiety now increase at a greater rate).

### **SENSORY**

Noticeable changes to the auditory, visual, and tactile senses may become apparent around 30 minutes to an hour after ingestion, although effects may take up to two hours to take place. These shifts in perception visually include enhancement and contrasting of colors, strange light phenomena (such as auras or "halos" around light sources), increased visual acuity, surfaces that seem to ripple, shimmer, or breathe; complex open and closed eye visuals of form constants or images, objects that warp, morph, or change solid colours; a sense of melting into the environment, and trails behind moving objects. Sounds seem to be heard with increased clarity; music, for example, can often take on a profound sense of cadence and depth. Some users experience synesthesia, wherein they perceive, for example, a visualization of color upon hearing a particular sound.

### **EMOTIONAL**

As with other psychedelics such as LSD, the experience, or "trip", is strongly dependent upon set and setting. A negative environment could contribute to a bad trip, whereas a comfortable and familiar environment would set the stage for a pleasant experience. Psychedelics make experiences more intense, so if a person enters a trip in an anxious state of mind, they will likely experience heightened anxiousness on their trip. Many users find it preferable to ingest the mushrooms with friends, people with whom they are familiar, or people who are familiar with 'tripping'. Users have stated that you can enhance your trip by being in an environment or setting where you are unlikely to panic.

### **SPIRITUAL AND WELL BEING**

In 2006, the United States government funded a random-ized and double-blinded study by Johns Hopkins University which studied the spiritual effects of the active compound psilocybin. The study involved 36 college-educated adults (average age of 46) who had never tried psilocybin nor had a history of drug use, and who had religious or spiritual interests. The participants were closely observed for eight-hour intervals in a laboratory while under the influence of psilocybin.

One-third of the participants reported the experience was the single most spiritually significant moment of their lives, and more than two-thirds reported it was among the top five most spiritually significant experiences. Two months after the study, 79% of the participants reported increased well-being or satisfaction; friends, relatives, and associates confirmed this. They also reported anxiety and depression symptoms to be decreased or completely gone. Fourteen months after the study, 64% of participants said they still experienced an increase in well-being or life satisfaction.

Despite highly controlled conditions to minimize adverse effects, 22% of subjects (8 of 36) had notable experiences of fear or paranoia. All subjects had never taken a hallucinogenic trip before. The authors, however, reported that all these instances were "readily managed with reassurance."

### **As a Medicine**

For more health related information on the main psycho-active ingredient, see psilocybin. Advocates for advanced research in the field of ethnobotany have been asking for medical

investigation of the use of synthetic and mushroom-derived psilocybin for the development of improved treatments of various neurological disorders, including chronic cluster headaches, following numerous anecdotal reports of benefits. There are also studies which include reports of psilocybin mushrooms sending both obsessive-compulsive disorders (OCD) and OCD-related clinical depression (both being widespread and debilitating mental health conditions) into complete remission immediately and for up to months at a time, compared to current medications which often have both limited efficacy[30] and frequent undesirable side effects. Recent studies done at Imperial College London, Johns Hopkins School of Medicine and Psychiatric University Hospital Zurich conclude, when used properly, psilocybin acts as an antidepressant as suggested by fMRI brain scans. The active components of psilocybin mushrooms have also been found to treat alcoholism and other addictions. The drug's potential as treatment to alcoholism is also similar to results found in relation to LSD in the 1950s and 60s.

## Dosage

Dosage of mushrooms containing psilocybin depends on the potency of the mushroom (the total psilocybin and psilocin content of the mushrooms), which varies significantly both between species and within the same species, but is typically around 0.5–2.0% of the dried weight of the mushroom. A typical dose of the common species *Psilocybe cubensis* is about 1.0 to 2.5 g, while about 2.5 to 5.0 g dried mushroom material is considered a strong dose. Above 5 g is often considered a heavy dose.

The concentration of active psilocybin mushroom compounds varies not only from species to species, but also from mushroom to mushroom inside a given species, subspecies or variety. The same holds true even for different parts of the same mushroom. In the species *Psilocybe samuiensis*, the dried cap of the mushroom contains the most psilocybin at about 0.23%–0.90%. The mycelium contains about 0.24%–0.32%.

## Magic Mushrooms FAQ

### **What is a mushroom?**

Mushrooms are fungi with a network of root-like filaments (called mycelium) growing underground, joined above ground by a stalk to a cap. The cap has a skin on top and gills underneath, from which are released spores ('seeds' for reproduction).

### **Why are they called 'magic' mushrooms?**

Throughout history many cultures have used hallucinogenic plants and fungi, although little is known about their use in Britain. In the Middle Ages, they were made into ointments and rubbed onto a membrane (often the sexual organs) with an available household instrument (i.e. a broomstick). Since flying was a common hallucination, myth and superstition led to the Christian Church wiping out most of the ancient knowledge and burning the 'witches' at the stake. Mind-bending mushrooms came to be seen, like poisonous ones, as 'toadstools'. Even today mushrooms are still portrayed in fairy tales and stories as things associated with pixies, goblins and other evil creatures (Liberty cap are called 'fairy mushrooms' in Ireland). The hippies rediscovered hallucinogenic mushrooms in the 1960's renaming them 'magic mushrooms' (because they're like magic man!) - or "'shrooms' or 'mushies' for short. They have remained relatively popular ever since (about a quarter-million British people took a 'mushie' trip in 2002) but have thankfully lost much of their pseudo religious hippy mysticism. Having said that, it must be pointed out that some New Age writers and philosophers claim magic mushrooms were brought to Earth by intelligent aliens in order to accelerate human evolution ....fetch me a stake and some matches!

### **What different sorts are there?**

As detailed below, each type of mushroom has one or more common names, and an 'official' name based on two Latin words (in italics), indicating their general group (genus) and specific type (species). Due to disagreements among experts, some mushrooms have more than one Latin name. There are over a hundred different species of hallucinogenic mushroom, some of which have different varieties based on country of origin (e.g. Mexican, Colombian). Many grow wild in Britain, while others are cultivatable indoors. It is not possible to identify them all in this short leaflet, so we will focus on the five types which are most commonly sold and used here. These include two native species; Liberty cap and Fly Agaric and three foreign mushrooms, namely: Cubensis, Hawaiian, and Truffles. Anyone intending to try other types should get a mushroom identification guide book (or use the internet) and learn to identify them accurately before picking and eating any.

### **Are they legal?**

Yes and no - it depends on the type of mushroom and in some cases, its 'condition'. Fly Agaric is totally legal. Neither the mushroom nor its main active ingredients - muscimol and ibotenic acid - are covered by the 1971 Misuse of Drugs Act (MODA) or any other UK drug laws. With Liberty cap, Cubensis, Hawaiian and Truffles, things get more complicated. The two main drugs found in these and most other magic mushrooms are psilocin and psilocybin. If they are extracted from the mushrooms or are made synthetically, they become Class A controlled drugs and are illegal to possess or supply. But because psilocin and psilocybin are naturally present in live or fresh mushrooms they are generally legal because they are considered to be "a naturally occurring substance." In short, it is legal to buy spores and growing kits, to grow and pick these mushrooms, and to eat and sell them if they have just been picked or are still 'fresh'. But psilocin-containing mushrooms become illegal if "they have ceased to be in their natural state and have been in some way altered by the hand of man."

In 2002, in response to queries from UK companies, the Home Office confirmed that it was legal to sell "freshly picked mushrooms provided they have not been prepared in any way." This

'preparation' ruling also applies to some other controlled drugs when in natural plant form, such as mescaline (in peyote and san pedro cacti) and cathinone (in the khat shrub), but it does not cover opium poppy, coca leaf, or the cannabis plant.

### **But when do mushrooms stop being fresh and become prepared?**

The clearest examples, as indicated by past court cases, are when they have been intentionally chopped/cut up, crumbled/ powdered, cooked or made into drinks or foods (e.g. tea, jam), or 'frozen and packaged'. But the legal 'grey area' concerns when the mushrooms are allowed to dry out naturally, or when their freshness is extended by mechanically chilling or simply freezing them - which are often necessary to prevent them from rotting or going mouldy.

Clearly, the main fault with the current law is that it discourages drying or freezing of magic mushrooms, which increases two health risks for users:

Risk One : the amount of fresh 'shrooms needed for a trip is harder to calculate than the amount of dried 'shrooms - the variable water content of fresh 'shrooms results in broad dose ranges which could lead to too many 'shrooms being eaten.

Risk Two : fresh 'shrooms are more likely to go mouldy or get diseased (making them toxic). The UK Medicines Control Agency has also advised companies that they cannot distribute information about the mushrooms they sell because they are not qualified herbalists, but that they can answer direct questions from customers. Most mushroom-selling companies advertise their products as for 'ornamental' or 'research purposes' only and prohibit sales to under-18s. Some shops also impose maximum sales of 35 grams per customer. The typical price is £5-10 for 10 grams of fresh mushrooms.

Very few people are prosecuted for psilocin offences. Possession and small-scale cultivation is typically dealt with by a police caution or a court fine. Supply and other trafficking offences, though rarely brought, are more likely to receive a prison sentence. 'Possession with intent to supply' covers intending to sell or give away psilocin or prepared mushrooms, as well as being in possession of more than is considered consistent with personal use (this amount is not defined). It is also illegal to drive while unfit to do so because of psilocin intoxication.

## USING MAGIC MUSHROOMS

Growing one of the five types of magic mushroom, or picking the two species which grow wild in Britain (Liberty cap or Fly Agaric), requires specialist knowledge in the form of an old hippie or illustrated guidebook. Whether picking wild ones or buying cultivated ones, one thing reduces risk more than anything else: making sure you have picked or purchased the 'right ones'. To this end, the appearance and habitat of the five main magic mushrooms is described in their respective sections and two other 'tests' for checking their identity are presented in the REDUCING RISKS section. The other main areas of advice concern preserving, storing, preparing and consuming them.

### **How are they preserved and stored?**

Magic mushrooms stay fresh for 5-10 days, particularly if they have a low water content (as *Cubensis* and *Truffles* do) and especially if kept chilled in the fridge. After this, to prevent rotting, they have to be dried, frozen or otherwise preserved. They will last several months to a year if frozen (in a sealed bag in a freezer), but totally drying the mushrooms allows them to last indefinitely.

Drying reduces the potency (drug content) of psilocin-based mushrooms only slightly, while actually making Fly Agaric 'shrooms stronger (and less toxic). They can be dried naturally by leaving them on paper at room temperature for several days, though, to reduce the risk of rotting, some people accelerate drying by placing them next to a radiator, or in an open-doored oven (350F) for up to half an hour. Cooking them in a closed-door oven requires a maximum temperature of 95F (36C) for psilocin-based mushrooms and 200F for Fly Agaric (see sections on each mushroom for details). They are totally dried when they turn to powder when crushed. It's then best to crumble them and mix up the powder to even out the strength. When kept for later use, the 'strength' of 'shrooms gradually reduces with time, though storing them in a cool, dark, dry air-tight glass container extends their shelf life.

### **How are they prepared and consumed?**

Most magic mushrooms can be swallowed raw (fresh or dried), or mixed into food/drink - the exception is Fly Agaric, which is better eaten cooked or at least dried (see: Fly Agaric). Fresh 'shrooms are soft and damp to the touch and before swallowing them they should be rinsed quickly in cold water and smelled/examined to make sure they are not stale or maggoty. Eating them mixed or cooked into food (especially spicy dishes) is inadvisable because of possible nausea and vomiting.

A more palatable method is to brew 'mushroom tea', by powdering and boiling in hot water for at least 10 minutes and drinking the liquid (herbal teas can be added to make it taste better, though sugar and vitamin C should not be added). If swallowed dry, it is best to chop up larger 'shrooms into smaller pieces (they generally don't taste good enough to chew) and to remove any straw-like stalks (to prevent them sticking in your throat), before washing them down with water. Some users prefer to crumble the dried 'shrooms, and swallow the powder in capsules or paper wraps. Though they cannot be sniffed or injected, some people smoke dried mushrooms (particularly Fly Agaric), although opinions vary on whether this 'works'. But few people now use the two most traditional methods of taking mushies, namely: making them into ointments, and applying them to membranes (like the genitals or anus) or drinking the urine of someone who has eaten *Amanita muscaria* (see: Fly Agaric).

### **How many mushrooms do you need for a trip?**

The following chart gives an indication of the dose needed for a medium and strong trip, which will be affected not only by the strength of the mushroom, but by your previous experience and

tolerance.

Regular users will experience tolerance (needing more of the drug to get the same effect) - in fact, tolerance to mushrooms is so rapid, that after about a week of daily use, the dose needed to get high would become unswallowable and possibly poisonous. Because of wide variations in both the size and water content (fresh mushrooms are between 5% and 90% water), it is difficult to estimate the number of mushrooms needed for a trip. The dried weight of mushrooms is a much better guide to a desired dose. However, because the law forces retailers to sell only freshly picked magic mushrooms, estimates of the weight of fresh mushrooms needed are also given. The potency (or strength) also varies depending on both the country the mushroom comes from and if they are wild or cultivated (indoor growing techniques can greatly increase potency).

What drugs are mixed with magic mushrooms? Mixing other drugs with magic mushrooms is generally not advisable, though many users recommend smoking cannabis as the effects are coming on, because cannabis is an anti-emetic - it reduces nausea and vomiting, the main unpleasant side effects of mushies. Some users also take a half to full dose of ecstasy just before they neck their 'shrooms, in order to produce a happy, 'centred' trip, and to reduce the risk of a bad trip. By contrast, some people sniff cocaine or speed, or take other trippy drugs like LSD or harmaline when on mushies - often to get more intense experiences, or just to get more energy (mushies can sometimes be 'mongy' on their own).

Lastly, as well as using other drugs to intensify or modify the main effects, some mushroom users use depressant drugs to assist the 'come down' into ordinary consciousness afterwards - such as alcohol or tranquillisers - though this is not advisable.

## The effects

### **What happens in your body when you eat magic mushrooms?**

When magic mushrooms are swallowed, they are digested in the stomach and intestines, and the active ingredients may be partly modified in the liver (e.g. psilocybin is converted into psilocin) before being passed to the heart-lung-heart loop to be pumped up to the brain. In the brain, psilocin works in a similar way to LSD by boosting a particular type of serotonin (5HT-2A) - a neuromodulator involved in controlling other neurotransmitters, and affecting such mental functions as mood, perception, memory, awareness and appetite. By contrast, muscimole, the main drug in Fly Agaric, works on the muscarine receptors of brain cells, affecting levels of acetylcholine, GABA and glutamate - neurotransmitters involved in movement, memory, learning and emotion. This is why Liberty cap and Fly Agaric produce different types of trip.

### **What does a magic mushroom trip feel like?**

Your mood, previous experience and personality, along with where it takes place have a major influence over what kind of trip you have. Dose is also critical, with full-blown hallucinations usually requiring higher doses. One magic mushroom trip differs from another as much as the effects of one drug differs from another. On the same trip, you can feel like you are sharing your friend's experience one moment, and then be in a world of your own moments later. The main thing to remember is that tripping is an active experience, not a passive one. In short, it's not like going to the cinema, paying for your ticket, and watching a specified movie. A useful metaphor to help you understand this point is to view tripping as like getting on a horse and going into a strange landscape. You can let the horse take you where it wants, hauling you up hills and back down into valleys, galloping for miles and then stopping and grazing - or even running round and round in circles. Alternatively, you can grab hold of the reins, and direct the horse into those parts of the landscape that interest you most - riding at your own speed, and in your own style. The more disciplined your mind is, and the more you prepare for the trip, the more likely it will be that you can control your trip - rather than it controlling you.

The particular experiences of tripping on the four psilocin-based mushrooms and Fly Agaric are each described below. But what they have in common, and what distinguishes them from LSD and synthetic hallucinogens, is that the trips they produce are more likely to involve warm, loving feelings; dreamy and trance-like states of mind; mystical and magical experiences; and natural, organic 'visuals' - such as animal faces, plant images and mythical creatures.

### **What is a bad trip?**

Some bad trips are caused by scary hallucinations (e.g. seeing 'monsters'), while others are based on an outpouring of 'repressed emotion' (bad feelings squashed to the back of your mind because you could not deal with them). But perhaps the main trigger of bad trips is 'ego loss' - changes in your sense of personal identity. This can be an unexpected experience ("I thought I was just going to see things"), which some people find terrifying. But bad trips are fairly rare on magic mushrooms and are generally limited to such scenarios as: feeling moody/upset or worrying about the effects before tripping; being in an unusual setting or having a bad experience (e.g. accident) while tripping; and taking a first trip or being 'spiked'. Most people getting a bad trip can 'muddle through' to the end without too much trouble. But what causes a bad trip to spiral out of control into a full-blown psychotic episode is panicking. Allowing yourself to become panicky when tripping is like trying to escape from a Chinese finger puzzle by pulling - the more you pull the tighter it gets (see: How do you deal with bad trips?).

### **Is there a comedown or any after-effects ?**

Compared with the nasty come-downs people get from drugs like crack, speed and alcohol, there is no real come-down from magic mushrooms. The day after tripping, people sometimes feel a little fatigued or confused, but major physical symptoms or mental problems are highly unlikely. Flashbacks - experiences of reliving the trip days to months afterwards - are also rare and when they do occur, tend to be brief, one-offs and fairly easily handled. Psychoses related to magic mushroom use are even rarer. The symptoms are similar to paranoid schizophrenia and are usually found in people with a family history of mental disorder - except that drug-related psychoses usually clear up after a few weeks, as long as the person stops taking the drugs. In fact, the main after-effect of tripping on mushrooms, particularly fly Agaric, is amnesia - memory for such strange experiences rapidly fades.

# Main types of Mushrooms

## LIBERTY CAP

### What do they look like?

Since the revival of interest in the 1960's, Liberty cap has been the most popular magic mushroom in Britain, though *Cubensis* has recently become a keen competitor. It is shaped like an upward-facing breast/umbrella, tapering to a distinctive nipple on the top. The size of fresh caps varies from 0.5 cm to 2 cm, while the spindly stem is 2-6 cm high. The cap and stem are a rusty brown/tan colour when fresh, turning to a paler brown/yellow when dry; while the gills and spores are chocolate-brown to purple.

### Where do they come from?

*Psilocybe* mushrooms grow wild all over the world and Liberty cap is the main species native to Britain. Their natural habitat is uncultivated or well-manured fields, pastures and woods and they prefer to grow on animal dung, peat, moss and rotting wood. In urban areas, it can be found in graveyards, parks, greens and garden lawns. It can also be cultivated indoors. The mushrooms grow in groups, sometimes partly hidden within clumps of long grass, from September to the first November frosts.

### What is in Liberty cap?

The main active ingredients in Liberty cap (and in *Cubensis*, Hawaiian and truffles), are psilocin and psilocybin. The combined amount of psilocin and psilocybin in Liberty cap varies between varieties and batches. Psilocybin is changed into psilocin by the liver - psilocin is about one and a half times stronger than psilocybin - so what 'hits' the brain and causes the effects is all psilocin. One of the closest chemical relatives of psilocin is bufotenine (MDMT), which is found in toad skin-slime, Central/South American tree bark/vines (used in voodoo potions), and in Fly Agaric. Other chemical cousins include LSD and DMT. Per milligram of drug, psilocin is eight times more potent than DMT, but about 100 times less potent than LSD.

### How much do you need to take?

About one to three grams of dried 'shrooms for moderate psychedelic effects, through to about 4 to 7 grams for a full-blown trip. Taking less than one gram of dried 'shrooms produces a light trip. Depending on freshness and drying method, the equivalent dose of fresh *psilocybe* mushrooms could be 2 to 6 times greater; between 2 and 20 grams for a moderate trip, and between 8 and 40 grams for a strong trip.

### What are the effects of psilocin?

Depending on dose and other things, a psilocin trip lasts between 3 and 8 hours, averaging 4-5 hours. Some users report subtle differences between the trips produced by the four main types of psilocin-based mushroom, though they share the same general effects, including three main stages (onset, main and residual).

The onset of the trip begins with physical effects (caused by adrenaline being pumped into your body), which are similar to, but less intense than, the effects of speed - including dilated pupils, a numb face, dry mouth, faster pulse and muscular tension. Appetite is generally reduced or eliminated, and nausea is very common, sometimes leading to vomiting. Although these physical effects continue throughout the trip, they become less noticeable as the main mental effects kick in. Trips also often start with a release of emotional tension - leading to mumbly conversations (confessing, regretting, laughing, crying, etc).

The main stage of the trip usually involves two experiences: episodes of altered moods and awareness; and visual distortions and pseudo-hallucinations (those you know are not real) - including: intensification of colour; moving objects leaving 'trails'; object replications (one cat becoming several cats); objects/ scenes seeming 'jumbled up' (rooms with doors on the ceiling); and psychedelic patterns. Other people may look very different from normal and appear beautiful, comical or terrifying. You may also see music and hear pictures (known as 'synaesthesia', which has to be experienced for it to make sense).

Later on your mood may swing between energetic and 'mongy'; calm and anxious; amazed and withdrawn; serious and hilarious. The mind can become highly focused on one thing, or overwhelmed by an explosion of ideas, as altered states of consciousness take hold - for instance: out-of-body feelings (astral projection), time distortions (slowing/stopping) and mystical experiences and revelations (contact with nature/God/'machine elves'). On larger doses, ego loss may occur. This is our sense of personal identity changing or dissolving, we might ask: "who/what the fuck am I?"

In the final residual stage of the trip, there is a gradual return to a normal state of consciousness, often in 'waves', with feelings that the trip is ending being suddenly overtaken by a rush of psychedelia. Users are often thoughtful and a little quiet during this phase, reflecting on the experience; while some report fatigue and headaches.

### **25-years old woman**

"One lazy Sunday morning, me and my two friends decided to finish off some mushrooms I had left. The first thing I noticed about an hour after swallowing 30 'caps' was that things looked brighter and sharper - but a sickly feeling was also growing in my belly. Just at the point I thought I was going to vomit, it began to subside... I was starting to feel different on the inside too - and my two friends were giggling and mumbling, but not to each other. The curtains, though still, looked like they were fluttering in a draft and my room seemed to be changing into a cave-like hole with hidden things in the shadows... My mouth had dried out, so I went to stand up to get a drink - but nothing happened. I looked at my legs and could not decide whether they were crossed or uncrossed. I asked my nearest friend 'are my legs crossed?' and she stared at them, for how long I could not tell, before saying 'non-crossed'. Then it dawned on me that I could not remember what I normally did when I wanted to stand up - so I said 'Just remind me how you stand up', but both of my friends simply fell about in fits of laughter... Later we went for a lark about in the woods to burn off some of the nervous energy and we all thought the trees looked totally like two-dimensional cardboard cut-outs... Then, I began feeling that I wasn't the same person any more and kept thinking that I might have swapped minds or bodies with someone.... Eventually, the trip started to wear off, we went home and I took a shower. I was drying myself, and looking into the mirror, when I noticed my face was slowly changing into an ape-face. I felt shocked but then remembered that I was still tripping - but had somehow forgotten all about it for a moment..."

## CUBENSIS

### **What do they look like?**

Its cap is ball-shaped, and coloured tan-orange to red, while its gills are whitish to purple-brown, its spores are chocolate-brown to purple, and the stem is white to bluish. The cap grows to 1.5 to 5 cm in diameter, while the stalk is up to 7 cm high, and is often thickened at the base. The Colombian variety is slightly larger, while Thai 'shrooms have thicker stems and green-hued caps.

### **Where do they come from?**

Cubensis is native to Central/South America and Southeast Asia, where it grows in fields and woods on dung, soil, and rotting leaves and wood. It has rapidly become one of the most commonly cultivated and sold magic mushrooms in Britain - mainly because it is relatively easy to grow (in growing tanks called terrariums), and because its low water content allows it to stay fresh for up to 10 days after picking. It has three main varieties - Mexican, Colombian and Thai - plus others (e.g. Amazonian, Equatorian, Indian).

### **What's in Cubensis and how much do you need to take?**

Like Liberty cap, Cubensis contains psilocin and psilocybin, but has a somewhat higher potency. Potency is highest in younger, ball-shaped mushrooms (as they age, they become shaped like an umbrella, then an inverted umbrella). Potency is also highest in the Thai variety and lowest in the Mexican variety, with the Colombian and Amazonian varieties occupying a middle ranking. So, the dose of dried mushrooms required for a trip on Mexican Cubensis is similar to that needed for Liberty cap (1-3 grams for a moderate trip, 4-7 grams for a strong trip); while doses of half this amount are advisable for a trip on Thai Cubensis (0.5-1.5 grams for a moderate trip and 2-3.5 grams for a strong trip) - with doses of Colombian and Amazonian Cubensis being somewhere in-between. But because Cubensis has a lower water content than Liberty cap, doses of fresh Cubensis should be no more than two to four times higher than the equivalent dose of dry Cubensis. For instance, a strong trip would require between 4 and 14 grams of fresh Thai 'shrooms; or between 8 and 28 grams for fresh Mexican 'shrooms (mail-order companies recommend at least 20 grams).

### **What are the effects of Cubensis?**

The general effects of psilocin are described in the section on Liberty cap, though users say that the distinctive features of a Cubensis trip are intense, colourful 'visuals'. Thai has the strongest, trippiest effects, while Mexican is described as more giggly and sociable.

## TRUFFLES

### **What do they look like?**

A truffle is a kind of subterranean mushroom - a fungal growth from the root-like mycelium, which feeds off plant roots. Because they cannot be seen from above ground, pigs and dogs are trained to sniff them out. Psilocybe truffles look like shapeless lumps of brown congealed muesli, and taste nutty but bitter. They should not be confused with the other kind of truffle, which looks vaguely similar but is actually a crunchy chocolate ball with no hallucinogenic effects.

### **Where do they come from?**

Truffles grow underground in central and south America countries, but are also cultivated indoors in the UK - their low water content (nearer 50-65% than the usual 80-90%) helps them stay fresh for longer, making them popular with retailers.

### **What's in Truffles and how much do you need to take?**

Since they taste OK, truffles are easier to chew up before swallowing. They have a potency similar to liberty cap. A strong trip would require between about 3 and 6 grams (dried) and a moderate trip about 1 to 2.5 grams. But when truffles are fresh, they are only about half to two-thirds water by weight, so the dose taken only needs to be double/treble that for dried truffles.

### **What are the effects of Truffles?**

The general effects of psilocin are covered in the section on Liberty cap, though users say that truffle trips are more physical, euphoric and 'visual'.

## FLY AGARIC

### **What do they look like?**

Fly Agaric is the red/amber-capped, white-flecked magic mushroom of fairy tales books. It has a yellow/orange to red cap, which is ball to disc-shaped, with white to yellow spots (warts) on top, white to cream gills underneath, and a stout white stalk with scales and a bulbous base. The cap can grow to very different sizes (from 7 to 20 cm in diameter), and the stalk can be 5-20 cm tall.

### **Where do they come from?**

Like Liberty cap, Fly Agaric is native to the UK, and grows wild in overgrown pastures and woods

(especially birch, larch or pine), but is very difficult to cultivate indoors. It has been used to get high all over the world for over 2,000 years. For instance, Fly Agaric was probably 'soma', the legendary drug of ancient times, and also underlies the Father Christmas myth of Lapland - his red costume represents the mushroom and the flying reindeers are linked to the fact that Lap reindeers grazed on Fly Agaric and hallucinations about flying were common. Historians have also suggested that the extremely violent ('berserk') behaviour of the Vikings when they went out 'pillaging and plundering', was partly induced by pre-battle munching of Fly Agaric. Red squirrels also eat Fly Agaric, though they have not yet shown any signs of going berserk - though it is probably best not to provoke them, just in case.

### **What's in them?**

The main active ingredients of the Fly Agaric mushroom are muscimole and ibotenic acid - though muscimole is hardly present in the live/fresh mushroom. The drying process turns the ibotenic acid into muscimole - which is five times more potent and far less toxic.

Fly Agaric's active ingredients are called 'isoxazoles'. They are among the only natural deliriant drugs, along with 'tropane' drugs found in plants used in witchcraft and herbalism, including: belladonna/deadly nightshade and datura/thorn-apple (atropine and scopolamine in both); and mandrake (mandragorine, hyoscyamine, and scopolamine) and henbane (tropine and scopine). Synthetic delirants include anaesthetics (e.g. ketamine) and solvents (e.g. butane).

### **How are they taken?**

Fly Agaric are taken in the same ways as the other mushrooms, except that they are more toxic if eaten fresh. So, it is best to hang it up to dry naturally, or else to cook it - either by boiling in salt water or preferably by oven-drying it at a temperature of 170-200F. The mushrooms sweat out their juice, so should be basted every 10 minutes - they are ready when the juice disappears and they crumble when touched. As well as destroying toxins and bugs, drying/cooking turns the ibotenic acid into muscimole (making the effects stronger). Many people recommend eating only the cap's skin and the thin yellowish layer under the skin.

The unique feature of Fly Agaric is that the same dose can be taken more than once! Its main active ingredient, muscimole, is the only known mind-bending drug which passes through the body into the urine totally unaltered - so, if you can stand the taste of piss, it can be used three or four times before it gets too weak (the Laps have been doing it for centuries!). It is in fact healthier to drink the urine of Fly Agaric eaters than to eat Fly Agaric itself, because the body of the first user filters out the more poisonous chemicals in the mushroom. If you do decide to drink the urine of a Fly Agaric eater, there is no need to boil it because urine is sterile, but to prevent vomiting you may need to swallow it in one gulp or else disguise the taste by mixing it with other drinks, unless of course you are a piss drinking connoisseur, in which case - ENJOY!

### **How much do you need to take?**

Because Fly Agaric is more toxic than psilocin-containing mushrooms, the safest dose to start with is 1 to 5 grams of dried material, which is a light trip. A standard trip requires 5 to 10 grams, while a strong trip requires up to 20 grams.

When the active ingredients are extracted or synthesised, the amounts needed for standard effects are 10 to 15 mg of muscimole or 50 to 100 mg of ibotenic acid. Redder-capped 'shrooms are

believed to be more trippy than yellow-capped ones, as are smaller ones, those with many warts, those growing earlier in the season, and the Siberian variety.

### **What are the effects of the Fly Agaric?**

The duration of the trip is unpredictable, lasting anything between 4 and 10 hours. It begins with physical effects, which include: slower heart rate, lower blood pressure, higher temperature, slower breathing, loss of appetite, nausea and stomach cramps.

The pupils (black bits of eyes) become bigger, along with a runny nose, salivation, sweating, twitching and trembling, muscle numbness (especially in the feet) and loss of balance. Emotional reactions are also common during the initial stage of the trip (regret, anxiety, etc.)

These effects subside after an hour as the main stage kicks in, starting off with a sedative, sleepy phase, which merges into a more energetic, hallucinatory phase (about 2-3 hours long). In the sleepy, trance-like phase, users often lie down and shut their eyes, leading to highly detailed fantasies/delusions (e.g. about flying, strange worlds) with vivid closed-eye imagery similar to the lucid dreams people have just before waking up. In the energetic phase the person usually sits up with open eyes. True and total hallucinations may occur (believing the hallucination to be real, and seeing things that are not really there). These can include hearing strange voices; visual distortions of size and shape, feelings of floating and flying, taste and smell hallucinations, and even 'synaesthesia' (hearing colours etc.). Emotional experiences vary but usually include hilarity and excitement - though fear is often 'blocked', making bad trips rare.

Any strange behaviour or energetic activities are also likely to occur during this phase, partly in response to true hallucinations or delusions. For instance, the red-faced rages and frenzy reported in users of Fly Agaric in ancient times (e.g. the 'berserk' rampages of the Vikings) are thought to have arisen during this phase. The capacity for rational action and thought and knowing what is real is also impaired. Thinking is more magical than logical, memory is disturbed and the user is self-absorbed and easily distracted. Perceptions of body and personal identity can be distorted. Lastly, there is a long tail off of effects over a 1-5 hour period, with hallucinations and fantasies coming and going erratically, and fatigue and hunger gradually rising.

### **22-years old boy**

"While camping in Wales for a weekend with friends, we all decided to eat some Fly Agaric mushrooms on the first evening. They had already been oven-dried, and I swallowed about three caps in small chunks washed down with water. Sitting round the campfire a few hours later, the first thing I noticed was feeling tense and sick and I soon puked, but just some water. Then my face started to go numb, my eyes went watery, and I started drooling and trembling all over...My body began to feel heavy, and I got sleepy. I went into the most bizarre dream while half-awake - I was vividly imagining I was in a huge gothic city, with thousands of levels and tunnels like a termite hill and the buildings were fantastic pieces of intricate sculpture bathed in neon lights of all colours. It was like being in some epic Hollywood movie, except that there were hundreds of characters and the story-line was all over the place, just like real life... then, I 'came round' and found myself staring at my friend's music-machine; I heard my friends talking excitedly to each other, but they looked like total strangers in the firelight, and they seemed small, as if a long way away. I felt more buzzy now and stood up to stretch my legs, but felt like I was floating away, and sat down quickly as a wave of nausea hit me. Every so often, the wind blowing in the trees sounded like someone whispering my name, and brought an exotic smell in the air ... whenever I stared into the fire for long, I started seeing the most amazing images of mythical creatures, like wizards, goblins and dragons - some looked as if they were talking right to me, but I couldn't hear any words...

The darkness beyond the fire felt and looked like huge mossy, stone walls all around us, and I kept thinking that I was in an ancient castle...After a few hours, I started to come back to normal a bit, but the hallucinations continued on and off for hours, until I eventually fell asleep”.

## Reducing the Risk

### How do you avoid picking and eating poisonous mushrooms?

Various types of poisonous mushroom resemble the trippy type, and many grow in the same places, so one of the biggest risks is mistakenly picking and eating these instead. For instance, there are 60 species of Amanita - these include Amanita pantherina (panther caps), Amanita virosa (destroying angel) and Amanita phalloides (death cap). Though many have hallucinogenic effects, with the exception of Fly Agaric, Amanita mushrooms are very poisonous -they seriously damage the liver and kidneys, killing most people who eat them, with survivors often requiring liver transplants. They also cause 90% of accidental poisoning deaths in the UK. But these deaths involve people who pick wild mushrooms for food or other purposes - there are no confirmed cases of fatal mushroom poisoning in the UK being attributable to drug users picking poisonous 'shrooms by mistake, instead of the 'magic' kind.

Similarly, several species of Inocybe, Conocybe and Galerina mushroom resemble Psilocybe mushrooms, but are poisonous - accounting for many cases of mushroom poisoning in the USA. Specialist mushroom picking books, the internet, and/or old hippies are the best starting point for the budding mushroom picker. In order to reduce the risk of picking or eating the wrong mushroom, you should make at least three independent checks on them. When running these checks, make sure that you choose two or more fresh, mature (fully grown) healthy specimens for testing.

### What are the tests?

**Test One** : using illustrated guidebooks, identify them by visual checks of the stem (stalk) and cap (skin and gills) - including shape, size, and colour. Also, smell and taste them so you get better at identifying them this way too.

**Test Two** : the damage test involves tearing/breaking a fresh mushroom - particularly the stalk - and checking 30 minutes later to see what colour it has turned. Psilocin-containing mushrooms turn blue at the tear, and the more potent they are; the bluer the damaged area is - which is why Hawaiian 'shrooms turn intense blue at the damage site. But there are also some poisonous species, which turn blue when damaged - which is why you need more than one test.

**Test Three** : each species of magic mushroom has different coloured spores, so they can also be identified by their spore-print. This test involves putting a fresh mushroom cap, gill-side down, on a piece of white paper (coloured paper if the spores are white), and placing a jar over the top (small mushrooms should have a drop of water placed on their cap to prevent drying out). Leave alone for at least half an hour, though the spore print may take up to eight hours to appear; then check to see what colour the spore-print is. For instance, Liberty cap and Cubensis generally have chocolate brown to purple spores, Hawaiian has black spores, and Fly Agaric has white spores. Rust-coloured spores indicate poisonous Inocybe mushrooms, which can resemble Psilocybe species.

The best time to pick Liberty cap or Fly Agaric mushrooms is during a dry/sunny day after several days rain between September and November. As well as checking you have picked the right ones, you should follow these rules too.

### What are the rules?

**Rule One** : to pick 'shrooms, twist the stem just above the ground until it breaks (don't just pull/rip, and don't cut).

**Rule Two**: always check freshly picked 'shrooms for signs of maggots, disease or mould, discarding

any which look unhealthy straight away (much harder to do when they are dried, and prevents contamination of other picked 'shrooms).

**Rule Three:** avoid carrying your picked mushrooms in a plastic bag or metal container, because this can make them sweaty and goopy - a paper bag or cardboard box is ideal, though a basket can help spread the spores as you move around).

**Rule Four:** avoid trespassing on private land, and remember the country code in rural areas, especially: not taking dogs with you, not dropping litter, shutting gates, and steering clear of crops and farm creatures - especially bulls (the ones with horns and big balls) and farmers (the ones with fl at-caps and big balls). It's best not to respond to warnings of "ged orf moi laaarnd" with retorts like "piss off sheep-shagger", particularly when the farmer has a large shotgun or dog by his side.

### **How do you identify and help someone with mushroom poisoning?**

The general signs and symptoms of mushroom poisoning include: watery eyes and mouth, a yellow pallor (jaundice), regular/violent vomiting, stomach cramps and diarrhoea, breathing difficulties, and agitation/confusion. In the worst cases, there will be fits, convulsions and/or unconsciousness - if death occurs, it is usually caused by heart failure. The signs of poisoning may show up within half an hour or as late as 40 hours after swallowing mushrooms, and some people appear to recover only to get ill again later.

Helping someone with mushroom poisoning always means taking them to hospital, even if they seem to be recovering. The later the symptoms show up, the more urgently the person should be taken to hospital.

In hospital, in addition to pumping the person's stomach, doctors can administer antidotes to the specific poison (e.g. atropine for Fly Agaric poisoning) and provide symptom-specific medication (e.g. to control vomiting).

### **How do you deal with a bad trip?**

Taking magic mushrooms on your own is not advisable as it means that there are no friends to help you if you have a bad trip. When tripping with friends, it is best if at least one remains straight (known as a 'ground control' or 'guide') - just to help confirm what is real and unreal, especially in an emergency (e.g. "is that blood on my hands or ketchup?").

If you come across a stranger having a bad trip (e.g. in a club or festival), it is best to locate their friends - strangers can seem scary on a bad trip and spending the night trying to calm down someone you've just met is not most people's idea of fun. If someone you know is having a bad trip, you can help them by carrying out one or more of the five steps from the Bad-trip Rescue Procedure:

### **What is the bad trip rescue procedure?**

**Step One :** take them to a quiet place with no distractions (like mobiles or TV/music) where they feel safe and can't accidentally harm themselves; and, to distract them from any bizarre thoughts, talk calmly to them about pleasant or ordinary things - and regularly reminding them that they are experiencing the effects of a drug, which will eventually wear off.

**Step Two:** if the bad trip continues, let them act freely but watch them to make sure they don't do anything risky or harmful - if they do (e.g. sitting on a window-ledge) try to persuade them to stop rather than trying to stop them - physical restraint should never be used unless they are about to do something very dangerous (and you feel brave). If they show strange but harmless behaviour - such

as hiding under a table - go along with it, as long it makes them feel better. Avoid doing anything that makes them more paranoid than they already might be (e.g. staring at them, whispering to others).

**Step Three** : if they remain upset but 'handleable', repeat steps 1 & 2 - but do not give them any food, drink or other drugs - except that it's OK to let them sip water or to let smokers have a cigarette (though watch they don't set fire to anything). Basically, a minor tranquilliser such as diazepam (i.e. a single 5 mg Valium tablet) is enough to bring most people out of a bad trip, though medicating a bad tripper should be left to doctors. Many users swear that sugary food and vitamin C help to bring down a bad tripper.

**Step Four:** if they become more and more panicky, ask them to do any relaxation exercises they (or you) know, especially controlling their breathing. If they hyperventilate, breathing in and out of a paper bag can help - it's important that you let them do this themselves, but advise them to stop when normal breathing returns.

**Step Five** : if, despite all these efforts they get worse, take them to a hospital - particularly if they start acting dangerously, or are still acting disturbed after the trip should have ended. They may be given sedation, and released when they are feeling better (if you are over 18 years old, it is very unlikely that the police will be contacted by the hospital). But you should remember that having strange doctors probe you with questions and instruments during a bad trip might make the whole thing worse.

Usually, none of this is necessary, and a bad tripper will calm down and recover within an hour or two - and be extremely embarrassed about the trouble they caused. It is also useful to discuss bad trips soon afterwards with friends, because memories of such weird experiences tend to fade quickly.

## Safer tripping

### **Be aware of the law**

Possessing and supplying 'prepared' magic mushrooms is illegal. As soon as magic mushrooms are 'prepared', they become Class A drugs.

### **Store mushrooms safely**

Store them away from children. A dry, dark, cool, airtight container prevents loss of potency - as does drying and freezing.

Find out as much as you can about tripping. Make sure that it's an experience you want.

### **Prepare yourself before a trip**

Don't trip if you have worries or are in a bad mood, as tripping can make this worse.

### **Plan your trip**

Have it in a safe place at a suitable time.

### **Avoid tripping alone**

Choose the 'right' people to trip with. Don't trip with strangers and never trip with children around. Never 'spike' anyone with mushrooms. It's dangerous and illegal.

### **Take the right dose**

New users should take a small test dose first to check how strong they are. All users should stick within the recommended amounts for each type of mushroom, keeping in mind the difference between fresh and dried ones.

### **Avoid frequent use**

Between once a year and once a month is the normal range. Avoid mixing mushrooms with other drugs. Particularly alcohol and medicines. Don't do anything dangerous when tripping. Like driving or swimming.

### **Help friends having 'bad trips'**

Use the 5 Step Rescue Procedure. When tripping together, it's better if one friend remains straight and acts as the 'ground control'.

### **Be responsible**

If someone shows signs of mushroom poisoning or other serious illness, even days after the trip, get them to hospital asap. If they are unconscious, put them in the recovery position first. If possible, take samples of the mushrooms the person has swallowed, or else their vomit; to show the doctors.

### **Carry condoms**

You may still have sex when tripping, make sure it's safer sex.

### **Stay healthy**

Take extra vitamins and nutrients after tripping. This will replace any depleted by the drugs taken, and helps to restore your brain to normal. For instance, tryptophan after psilocin trips e.g. in chicken and beans; and choline after fly Agaric trips e.g. in eggs).

## Growing Magic Mushroom Step-by-Step

This Chapter provides complete directions for cultivating psilocybin mushrooms in your home. The strain this guide is intended to help you grow is *Psilocybe cubensis* (Amazonian strain) mushrooms. It is the intent of this Guide to enable the first time grower to succeed at a minimal cost and with a minimal amount of effort. This growing guide is the only reference you will need. After a person has completed the entire cycle successfully, later generations of mushrooms can be grown with even less cost and effort. The initial cash outlay will be well under \$100 for a fully automated 'shroom factory. Subsequent crops can be produced for several dollars with expected yields of several ounces of dried mushrooms.

### Overview of the Procedure.

In order to grow mushrooms, a suitable substrate must be inoculated and colonized by the fungus. This step requires sterility because the substrate contains no preservatives and can be overrun by any mold or bacteria that is present. This first step takes place in canning jars prepared in your home's kitchen. It uses brown rice flour and vermiculite which are both readily available. A substrate is prepared, placed in the canning jars and sterilized with heat. After the jars cool, they are inoculated with a spore syringe. This phase of the cycle can be completed for less than \$25 and will produce enough substrate to yield many ounces of dried mushrooms.

After the substrate is inoculated, you wait until it is colonized completely by the fungus. Once the substrate is colonized completely by the fungus, sterility is less of a concern because the fungus is pretty much able to fight off invaders and the rice cake substrate can be removed from the jar. This typically takes between two and three weeks to complete. At this point, the substrate is placed in a terrarium where high humidity is available to the fungus. While waiting for the substrate to colonize completely, no effort is required.

The terrarium is kept at around 90% humidity and the carbon dioxide that is produced by the fungus is constantly eliminated. Within a week of being placed in the terrarium, the rice cakes will start growing mushrooms. Within several weeks of being placed in the terrarium, the cultivator will have numerous mature mushrooms ready for consumption. The cakes continue to produce mushrooms until either the nutrients in the rice cake are used up or the moisture in the rice cake is depleted. Depending on how the cultivator chooses to implement the terrarium, more or less attention is required at this phase in the cycle. With the fully automated terrarium setup described later in this document, attention is only required every few days. Mostly, this involves picking mature mushrooms and adding water to the humidifier used in the setup.

It is very likely that the mushrooms will be produced faster than they can be consumed by the home cultivator once the cropping phase of the cycle starts. It is fairly easy to dry the mushrooms and preserve them for many months. In fact, some people prefer the dried mushrooms to their fresh counterpart. Being the master of understatement, let me state that they do not taste as good as mushrooms available in the grocery store.

Occasionally, a sterile spore print from a mature mushroom needs to be generated if the cycle is to continue. This is used to produce a spore syringe to inoculate new culture jars. It is a little bit of effort and requires very careful, sterile procedures to be successful generating a spore print. Of course, this can be circumvented by simply ordering a new spore syringe. A 10 cc. spore syringe should be sufficient to inoculate a dozen jars of substrate. It is the cultivator's choice which path to follow for successive generations.

## Preparation of the Substrate.

Mushrooms are grown on a substrate of nutrients. Just as a common house plant is grown in pot of soil, mushrooms can be grown on a cake of substrate material. The big difference is that the substrate must be free of competing bacteria and molds in order for the process to be successful. Any contamination of the substrate will result in failure of the process.

Materials needed:

- 1/2 pint canning jars
- Vermiculite (from any garden department. K-Mart, Target, etc.)
- Brown Rice flour (from a health food store --- No Preservatives!)
- Large pot with lid
- Measuring cups
- Mixing bowl
- Hammer and small nail
- Spore Syringe

The canning jars need to be tapered. This means that the opening of the jar is wider than the body of the jar. This is important because the fully colonized rice cake needs to be removed intact from the jar. You simply want the cake to slide out when the time is right. If you use a jar that is not in the following list, check to make sure the box says it is a tapered jar. The following jars are acceptable:

- Ball 1/2 pint jelly jars.
- Kerr wide mouth 1/2 pint canning jars.
- Ball regular mouth 1/2 pint canning jars.

### Step 1:

Prepare the tops of the culture jars so that they can be in place, on the jars when inoculating the jars with the spore syringe. Part of the reason this system works so well in the non-sterile kitchen environment is the fact that the sterilized substrate is never exposed to air born contaminants. Get a small nail and use the hammer to poke 4 holes in the lid of each canning jar. See the following figure:

### Step 2:

Decide in how many jars you are going to initiate cultures. The average terrarium that is built will hold 6 rice cakes but you may have some jars destroyed by contamination and some jars colonize quicker than others. It is unlikely that every jar you prepare will be ready to be placed in the terrarium at the same time. The rice flour and vermiculite are cheap enough that it makes sense to do a dozen jars.

For each 1/2 pint jar mix 2/3 cup vermiculite and 1/4 cup brown rice flour in a mixing bowl.

Adaptation-23 When these ingredients are well mixed, add 1/4 cup of water for each 1/2 pint jar you plan to prepare. If you are using 1 pint jars you need to double the recipe. Mix all of this stuff up well. This mixture is the substrate material that the fungus will consume and use for growth.

### Step 3:

The next step is to fill each jar with substrate material. Adaptation-20 The material should be pressed gently together so that it will hold its shape if and when it is removed from the jar. The more tightly the material is pressed together, the slower the fungus will colonize the jar. Do not pack the substrate too tightly. Adaptation-3 Fill each jar to within 1/2 inch of the top with substrate material. If you run out of substrate material, either mix up enough for one more 1/2 pint jar or cannibalize a jar to fill up the rest of the jars. This is important because you need to make sure the

substrate is high enough in the jars for the spore syringe to inject spores into it.

**Step 4:**

The top 1/2 inch of the glass on each culture jar needs to be cleaned. No substrate material can be left on the glass above the compressed cake. First wipe it with your finger to get the bulk of the material off of it and then do a thorough job with a moistened paper towel. The glass needs to be spotless. The reason this is necessary is that bacteria and mold can use any material left there as a wick to infect the main substrate body.

**Step 5:**

Next, fill the top 1/2 inch of the each culture jar with vermiculite. This layer is pure, simple, dry vermiculite. Nothing else. Fill the jar level with the glass edge. This layer is a break through pioneered by Psylocybe Fanaticus. What this layer does is insulate the sterilized substrate from any air borne contamination. This layer gets sterilized with the substrate later and air borne molds and bacteria can not (usually) get through it to contaminate the substrate. At the same time, it allows some gas exchange to occur. The fungus needs oxygen and gasses can filter through the vermiculite.

**Step 6:**

Now, place the jar lids in place. Normally, the jar lids have a rubber seal that is placed in contact with the glass of the jar. Traditionally the rubber seal is not placed in contact with the glass. It was placed on the upper side of the lid. The reason was that people thought it would make too tight of a seal. This does not seem to be an issue. If you wish to follow tradition, place the rubber on the upper side of the lid. Screw the lid down tight. Note that you need to have the four holes poked in the lid in Step 1. Otherwise you can have real problems when you heat these jars up!

**Step 7:**

Next, place a piece of tin foil over the top of each jar and crumple it around the sides of the jar. This is to keep water drops from going in the four holes in the lid while the jar is being sterilized. If you poked your holes in the lid such that the sharp edges are pointing up, be careful not to rip or puncture the tin foil. If you need to, you can add a second or even a third piece of tin foil to make sure water will not drip into the holes in the lid.

**Step 8:**

Now the culture jars need to be sterilized. Place the jars in a large kitchen pot and add water so that water comes half way up the side of the jars. Bring the water to a slow boil and place the lid on the pot. From the time the water starts to boil, the jars need 1 hour to be sterilized. Water should not be bubbling and splashing all over the place. The jars should not be floating around in the water. The substrate in the culture jars has the right amount of water in it already. You do not want water leaking into the jars and changing the ratio.

**Step 9:**

Take the jars out of the hot water and set on a table or counter to cool. The jars need to be at or close to room temperature in order to inoculate. The spores will be killed if the jars are not cool enough when they are inoculated. It will take several hours to cool sufficiently. You may hear sounds as the jars cool. This is normal.

**Step 10:**

Now comes the good part. Inoculation of the culture jars. Assuming you have a viable, sterile spore syringe, you are now in a position to inoculate the cultures and start the first phase of the growing cycle. The needle of the spore syringe must be sterile. If your fingers or anything other than the lid

or contents of the culture jars comes in contact with it, assume it is no longer sterile. If there is any doubt about its condition, use a cigarette lighter to heat the entire needle. Heat it until it glows red. Let it cool for a few minutes and squirt some of the solution out of the syringe. Shake the syringe. Make sure the spores are mixed well within the syringe. This can be accomplished more easily if you pull the plunger back on the syringe to get a little air into the syringe. Remove the tin foil from each culture jar as you prepare to inoculate it. Insert the needle of the syringe as far as it will go into a hole in the lid of the culture jar and get the needle to press against the glass. Examine the next figure for a simple diagram of how things should look. Inject 1/4 cc of solution at a site under each hole in the lid. A total of 1 cc of solution for each jar.

A 10 cc spore syringe is sufficient to inoculate a dozen jars if you inject slightly less than 1 cc in each jar.

### **Step 11:**

This is the easy part. Put the culture jars in a dark place and wait. The fungus will first appear as little splotches of white fuzzy stuff at the inoculation sites. As the time goes by, the fungus will spread throughout the jar. Eventually, the entire surface of the glass will be covered with fungus. Typically, the bottom of the jar is the last area to be colonized. Be on the look out for any contamination.

Any odd colors that might appear are contamination and the jar must be thrown out. Do not take any chances. If you think the jar might be contaminated, throw it out!. Some molds and bacteria produce toxins that can kill you. Just because a mushroom is growing on the opposite side of the cake from the contamination does not mean you are safe. The mycelium network carries nutrients and moisture to the mushrooms from far away and can easily pick up the toxins and bring them to the mushroom. The fact that you are using this guide means you are not an experienced mycologist. You do not know which molds and bacteria are deadly. Do not take a chance.

The one exception to the previous statements is the mycelium will some times change from a bright white to a very pale yellow if it has water droplets touching it on the side of the glass. It is very unusual for any area that is colonized by the mushroom fungus to become infected while in the jar. The uncolonized areas of the substrate are usually significantly more prone to infection.

The above pictures show a typical germination and colonization cycle. If your spores are old, or the temperature is not optimum, or you did not mix the substrate very accurately you can easily add a week to the above time frames. The cake must stay in the jar until the entire surface area is covered with mycelium. As the substrate gets more colonized, the growth slows down. This is a result of CO<sub>2</sub> building up and less oxygen being available for the fungus to consume. The cakes cannot be taken out of the jars while there is still uncolonized substrate.

### **Step 12:**

Once a rice cake is fully colonized, it can be taken out of the culture jar. At this point, there are no areas on the substrate that can easily be infected by competitor molds and bacteria. Once the mycelium is established, it can usually prevent other organisms from gaining a foot hold and destroying the rice cake.

Unscrew and remove the lid from the canning jars. Scrape all the loose vermiculite on the top of the substrate into the garbage. Take care not to gouge into the substrate material as this can leave areas open to infection. You do not need to get all the vermiculite off of the cake. In fact, the only reason to remove any of it is to keep the terrarium neat and orderly. Turn the jar up side down and slam it onto a table top. The rice cake should slide out of the jar. The rice cakes will typically shrink a little

during the colonization phase of the process and will come out of the jars easily with a little tapping on a table top.

### **Step 13:**

The rice cakes need to be placed into the terrarium. It is assumed that you have a fully functional and checked out terrarium setup at this point. This document contains all the information you need to prepare a terrarium. You can handle the cakes but remember that the less you handle them and the more gently you handle them, the better off they will be. Also, you should wash your hands thoroughly and be sure to rinse with water just as thoroughly to remove any soap before touching the cakes. If you have disposable sterile gloves available, it isn't a bad idea to use them. You can get away without using them, but they are a good idea. Contamination is the mycophile's worst enemy.

## **Construction of the Terrarium.**

The main purpose of the terrarium is to provide the high humidity required for mushroom development. The rice cakes will live inside the terrarium during the cropping phase of the growing cycle.

There are three different setups described in this document. The first two are based on work done by Psylocybe Fanaticus. They work, and you will get some mushrooms, but they require a lot of attention and your production will be very limited compared to the third option. I strongly encourage you to choose the one that uses the ultra-sonic humidifier to keep humidity up. It requires very limited maintenance and works very well.

All three of the terrarium setups require the same growing chamber. The difference is the strategy for keeping the humidity high inside of the growing chamber. If you want, you can start with one of the simpler versions and switch to a different setup later if you are unhappy with it. Note that if you start with the ultra-sonic humidifier version, we don't expect that you will want to switch to one of the other two.

### **Basic Growing Chamber.**

Materials needed:

- Styrofoam Cooler
- Wire Mesh (1/4 or 1/2 inch is ideal)
- Plexi Glass (a 24 by 24 inch piece of window insulation or fluorescent light diffuser) If using hand
- sprayer method of boosting humidity.
- Silicon Glue
- Humidity Gauge

The cooler needs to have a very tight fitting cover. The idea is to seal in humidity, and the looser the lid is, the more difficult this is. Except for the cooler, everything you need can be found at your neighborhood building supply store. Below are diagrams detailing the various components of the terrarium. There is no way to predict the dimensions of the cooler that you will use. You will need to use some common sense as we walk you through the steps to build your terrarium.

The purpose of the wire mesh is to hold the rice cakes off the bottom of the cooler where moisture

will collect. The easiest thing to do is cut a piece of wire mesh an inch wider and an inch longer than the dimensions of the bottom of the cooler. Then, use a pair of pliers to bend a 1/2 inch ridge all the way around the piece of wire mesh. The piece of mesh will be held up by the bent ridge. Often times, when mushrooms are growing, space above them is at a premium. Try not to raise the wire mesh more than a 1/2 inch above the bottom of the cooler. Doing that simply wastes valuable space.

Next, if you are going to use the hand sprayer method of adding humidity, a drip shield needs to be installed. If you are using a fish tank bubbler or an ultrasonic humidifier, it is optional but still a good idea. As moisture condenses inside the terrarium, this protects the rice cakes from being 'rained' upon. Any moisture that forms on the lid of the cooler can drip and will be stopped by the drip shield from hitting the rice cakes. Any moisture that forms on the bottom side of the drip shield will form beads and run down to the side of the terrarium where it can drip harmlessly. If you use a piece of plexiglass that is textured on one side, put the textured side pointing up. You want a smooth surface on the bottom side of the drip shield so that moisture can easily run down to the side of the terrarium.

The drip shield is held up by several bolts sticking through the side of the cooler. Depending on what size canning jars you use and the height of your wire mesh, you will need to figure out where to put them. You want the drip shield to be at as steep of angle as possible to make water run down it easily, but you want it high enough that your mushrooms have room to grow without touching the drip shield. The drip shield needs to fit well. You need a small gap on the edges to let air circulate, but keep it small. About 1/4 inch is good. In other words, the drip shield should fit pretty well to the inside of the cooler, but it is not supposed to be air tight. Also remember when shaping the drip shield that you cannot go to the very top of the cooler because the lid will recess into the cooler a little ways.

If you are using a Styrofoam cooler, you should use washers on the bolts on both the inside and outside of the cooler. This will allow you to tighten the nuts on the bolts snugly to keep the bolts from tearing up the cooler as you move the drip shield during normal maintenance.

Next, the top of the cooler needs to be modified to allow light to enter the terrarium. *Psilocybe Cubensis* is a phototropic mushroom. It needs light to initiate pinning and to tell the mushrooms which way is up. You should have some plexi-glass left over from the drip shield that can be used for this purpose. Cut a hole in the top of cooler. Cut a piece of plexi-glass a little bit bigger than the hole in the cooler lid. Run a bead of silicon glue all the way around the hole in the cooler top. Position the plexi-glass over the hole and let the glue setup.

That is it. The basic grow chamber is done. Now you need to decide which method you are going to use to keep the humidity high and the CO2 concentration low while the mushrooms are growing.

## Method 1: Hand Spraying.

This is the original method that Psylocybe Fanaticus recommended for the home cultivator to grow mushrooms. It is the least expensive. It is the most labor intensive and forces you to conform to a demanding schedule. The only thing you need in addition to the basic growing chamber is a spray bottle that can put out a fine mist.

The procedure is this: At least four times a day the terrarium needs to have humidity injected into it via the spray bottle. At least twice a day the CO<sub>2</sub> that has built up needs to be eliminated. Once a day you need to eliminate water from the bottom of the terrarium that has condensed and formed there.

Once a day, you need to remove the standing water from the bottom of the terrarium. You can use a turkey baster to suck the water out, or you can gently remove each cake and turn the terrarium upside down to drain the water out. If you remove the cakes, be very gentle. Any place you touch the cakes will not fruit. You should pick up the cakes in the same place every time.

Twice a day, the CO<sub>2</sub> that has accumulated in the chamber needs to be removed. One method is to remove the drip shield and fan the inside of the cooler with the cover for 10 or 15 seconds. Another method that works well is to have a hair dryer next to the cooler and use it. Simply lower it into the terrarium with the exhaust jet pointing up and out of the terrarium and turn it on. It will suck all the existing CO<sub>2</sub> out of the chamber. Be sure not to hit the rice cakes with the hot exhaust air. It will damage them. If your hair dryer has a 'cool' setting, use that instead of 'hot'.

In order to create humidity in the terrarium a spray bottle that is capable of generating a fine mist is used. There are a lot of different products for use in the kitchen that have an adjustable spray nozzle, but if you choose to recycle one of these, make sure it produces a very fine mist. What ever you use, make sure it is entirely clean of the original chemicals. Let's make this perfectly clear.

Make sure the bottle is clean and does not contain anything that will damage the fungus. The safest thing to do is go to the hardware store and buy a high quality spray bottle. These typically produce a finer mist than most kitchen type spray bottles. The problem is that you would not be using a spray bottle if you had a little extra cash so we are telling you that you can use a kitchen spray bottle if you are careful. In order to create the necessary humid environment in the terrarium, the nozzle is slipped under the cover of the cooler and sprayed at the center of the top side of the drip shield.

After spraying for 5 seconds, pull the spray nozzle out of the cooler and let the lid quickly close, sealing in the vapor. The small water drops will dramatically raise the humidity of the chamber. The rice cakes can not ever be sprayed directly. The mycelium is very fragile and doing that will damage it. The terrarium needs to be sprayed at least 4 times a day. More is better.

This setup and procedure will work and is very inexpensive, but that is the only good I have to say about it. You become a slave to your terrarium. If you miss a couple sessions, your fungus will most definitely suffer because of it. Also, you can only support a few growing mushrooms at a time using this procedure. The mushrooms pull a lot of humidity out of the air and this method doesn't provide much excess.

## Method 2: Using an Ultra Sonic Humidifier.

This is the best method. It will free you from the tyranny of your terrarium. It will effortlessly produce enough humidity to support as many mushrooms as you can grow at once. This setup will automatically eliminate CO2 buildup before it occurs. The only drawback is that ultrasonic humidifiers cost around \$40. A little more for a super nice one, a little less for a budget version. Just about any ultrasonic humidifier will work. A steam humidifier is not easy to integrate into this terrarium setup. First, the vapor it emits is too hot and will kill the fungus. The second reason is they typically run full blast. They do not have a control to throttle them way back like the ultrasonic humidifiers do.

### Materials needed:

- Ultra Sonic Humidifier
- 8 feet of 7/16 inch outer diameter, 5/16 inch inner diameter vinyl tube
- 1 dozen 3/8 inch inner diameter grommets
- 4 clear 2 liter coke bottles
- 3/8 inch, fine thread bolt
- tube of silicon glue
- pliers
- high granularity A/C timer.

First, a small hole needs to be placed in the Basic Growing Chamber to let water and CO2 escape. It should be at the very bottom of the cooler. It needs to be big enough that water will not bead up and plug it. 1/2 to 3/4 of an inch is good.

This setup uses the ultrasonic humidifier to produce air that is close to 100% in humidity. The air flow out of the humidifier is limited by the fact that it has to travel through the 7/16 inch vinyl tubing. That is OK, because we want to limit the amount of air we feed into the terrarium. The humidifier will generate very humid air, but the air will also have many suspended water particles in it. Any time one of these water particles touches another water drop, they will merge. We don't want moisture forming on the rice cakes, so limiting the number of suspended waterdrops we allow into the terrarium is a big step towards this goal.

Even so, the air must be dried further. The air is passed through several stages where it is allowed to swirl and condense. Each one of these stages is comprised of an empty 2 liter coke bottle or some other suitable container. These stages are connected together using the 7/16 inch vinyl tubing.

Every time a piece of vinyl tubing is used, it needs to be fluted. This means it is not cut off square, but rather at a very sharp angle. This is necessary to help moisture that condenses inside the line to drip out once it reaches the end of the line. Otherwise, it will form a big drop and eventually plug up the line. At that point you have no humidity entering the terrarium.

Drill a 7/16 inch hole in the center of the exhaust lid for the humidifier. Insert a grommet. Apply a bead of silicon glue to the slit through which vapor normally exits. You want to plug this slit up.

The only exit for vapor should be through a piece of vinyl tubing that will be placed inside this grommet.

Remove the labels on the coke bottles. Any large plastic container can be used but the 2 liter coke bottles are real nice because they allow you to see inside. This is useful to determine if the terrarium is running correctly later. Also, you will be able to see if moisture that has collected in the bottle needs to be emptied out of it.

Heat up the threads on the 3/8 inch bolt using a propane torch or burner on a gas stove. A cigarette lighter will work, but it will take a long time. Hold onto the bolt with the pliers. When the bolt is

hot, quickly and neatly poke two holes in each 2 liter coke bottle.

The bolt that is used is deliberately a little smaller than the hole that needs to be generated. The hot bolt will melt the hole a little bit bigger than it is when it pokes through the plastic bottle. You may need to insert the bolt a second time into the hole and let it touch the sides to expand the diameter of the hole. Sometimes little chunks of plastic stick to the side of the hole. Use a sharp knife to clean up the edges and insert a grommet. Check the fit of the vinyl tubing through the grommet. It should be very snug and air tight, but it should not collapse the inner diameter of the tubing very much. Connect a piece of tubing from the humidifier to the first coke bottle. Flute both ends of each piece of vinyl tubing. Connect the this coke bottle to the next. Do this until you have all four coke bottles connected. The picture shows 3 coke bottles because that is what is normally required, but for now connect in all 4. Now connect the last coke bottle to the terrarium. You will need to poke a hole in the side and insert the tubing. The tubing should be blowing humid air into the part of the terrarium that is above the drip shield.

## The Growing Cycle

This section is relatively short considering its topic. That is because when you get to this point you are only needed to make sure the fungus has the right conditions to thrive.

Once you place a fully colonized rice cake in the terrarium it just needs several things to grow mushrooms. It needs high humidity, temperatures below 90 degrees F. and a little light. Once the mycelium network has gained access to enough nutrients the cake can initiate mushrooms if conditions are right. The initiation of mushrooms requires some light and temperatures in the mid to upper 70's F. The mushrooms can grow at higher temperatures, and in fact grow faster at higher temperatures. But the fact remains that the temperature range is fairly narrow to start new mushrooms. Normally, it takes about a week for pin heads to form if the rice cake was removed from the culture jar as soon as it was 100% colonized. It can happen after just a couple days if the network is well established, or it can take several weeks if things aren't just perfect for the cake. If you keep the terrarium's temperature in the mid to upper 70's F. you will be constantly initiating new mushrooms (pin heads) while providing a good environment for the growing mushrooms to mature. This is the simplest way to grow if you can arrange for this to be the case. If you deviate outside of this temperature range, you will still get a few mushrooms, but the fungus will initiate new pin heads only occasionally. You will spend a lot of time waiting for a mushroom to form. The rice cakes will have a very bright white appearance when they are first placed in the terrarium. Soon, they will be coated with a layer of fluffy mycelium. When pin heads form, they will look like a short section of a common pin. Hence, the name. The end of these pin heads will soon grow dark brown. This is the cap beginning to form. When the rice cakes are fresh, the small mushrooms will start adding bulk rather than grow longer. They will form balls the size of a marble. Then, they will start to thin out and grow long, adding bulk the whole time.

You should avoid the temptation to grow the mushrooms as large as possible. Significantly more psilocybin is produced during the early periods of growth. By letting the mushroom grow too large you are simply consuming nutrients and moisture from the rice cake for no purpose. Also, the mushrooms taste increasingly bad as they get larger. Lastly, the mycelium network in the cake can only provide so much in the way of nutrients and water to maturing mushrooms. If you let the mushrooms grow too big, they will hurt the development of other mushrooms on the cake. The mushrooms should be picked just as the cap is starting to tear away from the stalk.

As the cakes get older, they will produce less and less and it will be more difficult for the mushrooms to grow. This is a result of the moisture in the cake being consumed by the earlier mushrooms. You will eventually see mushrooms form and start to grow but never bulk up during the initial phase of development. These mushrooms will seldom get big enough to develop caps. You can harvest these mushrooms but it is an indication that the rice cake is about exhausted.

## Drying and Preservation of Mushrooms

Once you have grown and harvested some mushrooms, you need to think about preserving them. They will only keep for a short time in their fresh state. Sometimes a single mushroom needs to be harvested and it isn't enough for a dose. Other times, too many mushrooms will be fully grown for a single dose. Either way, you will be in a situation where you want to preserve them for later. And, even if this didn't happen, you may find yourself in a situation where you simply don't have the time or inclination to trip. The good news is that if they are dried correctly, nearly all of the psycho-active compounds can be preserved for many months.

There are several ways to dry them, but we will only cover the best way. Whatever you do, don't use heat to dry them. Heat is very harmful to the psycho-active compounds. You will drastically reduce the mushroom's potency if you use heat to dry them.

Materials needed:

- 1/4 inch wire mesh
- carton of Damp-Rid or Damp-be-Gone (Anhydrous calcium chloride)
- Large, freezer size zip-lock bag

Several pounds of calcium chloride can be purchased for a couple of dollars at any large building supply outlet. It will usually be found in the paint department because it is used to dry the air in musty closets before painting and things like that. If possible, get the bulk refill containers. It will be cheaper than the calcium chloride that comes with the units to hold it and the moisture pulled from the air. You won't be using the unit, so don't buy it unless you have to.

Bend a section of the 1/4 inch wire mesh to look like the following illustration. A 7 or 8 inch square piece is a good size to try first. This piece of mesh is going to be used to hold the fresh mushrooms up and away from the anhydrous calcium chloride.

If your freezer bag is big enough, put the entire contents of the calcium chloride container in it. Be careful not to let the desiccant come in contact with the top surface of the bag. When you are using the drying system, it is possible for mushrooms to touch the upper side of the bag and you don't want any residue from the desiccant there. Lay the bag on its side and smooth out the contents.

Place the wire mesh screen on top of the desiccant in the bag.

Typically, the screen will have sharp edges along each side where it was cut from the stock. Each wire in the mesh will have a sharp edge. Be careful not to let these sharp edges poke a hole in the bag. Make sure the calcium chloride is not touching the bottom of the screen. There should be an air gap between the top of the desiccant and the bottom of the screen. You do not want your mushrooms to touch the calcium chloride while they are drying because some of it will dissolve into the mushroom if this happens.

That is the entire preparation for preserving your mushrooms with minimal loss of potency. In order to dry your mushrooms, simply harvest them and place them on the wire screen. Close the zip-lock bag so it is air tight. The mushrooms will shrink and shrivel over the next couple of days. After about three days, they will be fairly hard and contain very little moisture. If you are not pushed for

space inside the bag, you may as well leave them in the bag for five or six days to thoroughly dry them.

After the mushrooms have been in the bag for three days, they can be moved to another zip-lock bag for long term storage. Remember that the dryer the mushrooms are, the longer they will keep. The reason this system works so well to dry the mushrooms is the calcium chloride is a good desiccant. It has a very strong affinity for moisture and can pull almost all the moisture out of the air. Eventually however, liquid will start to collect in the bottom of the bag. Mushrooms are 92% water by weight. This moisture has to go somewhere when the mushrooms are dried, and it will eventually find its way to the bottom of the bag.

You have several choices when moisture starts to collect in the bag. You can simply drain it out and continue to use the old desiccant. It will work, but you should be careful not to contaminate the upper side of the bag or the screen with residue from the desiccant. You do not want your mushrooms to touch the residue. For one thing, it tastes terrible, but in addition to this, the mushrooms will not dry completely. The residue will attract moisture. If the bag gets contaminated and you still want to use the old desiccant, try to pour it into a new bag without letting it touch the top side of the bag. Rinse the screen and place it in the bag.

Another option is to simply throw it out and set up a new bag with fresh desiccant. Lastly, you can dry the desiccant in the oven and reuse it, but if it gets too hot it will melt into a big brick and loses much of its surface area. This will limit its effectiveness. If you choose to dry it in the oven, try 225 degrees Fahrenheit for an hour. Also, you must keep the desiccant sealed in an air tight container while it is cooling or it will absorb a fair amount of moisture from the air before you put it in a new zip-lock bag.

## Ways to ingest - Recipes

First, we need to make sure some thing is understood. Before you dose, you need to be some one that likes your self and feels pretty secure about your self. You should not have any major troubles in your life. If this does not describe you, don't dose! Go find some other drug to play with.

OK, you've decided that your going to dose. After all, why did you grow these little devils if you weren't going to trip? The most important question to answer is how hard do you want to trip? If a 170 pound person had never done alcohol before, this is the advise I would give him. Dosage could be anywhere from 1 beer to 12 beers. 1 beer is just enough that you might feel something, but everything will be pretty normal. 4 beers is enough you will have a strong sensation of what alcohol does, but you will be in complete control. At 6 beers, you will start to be drunk. At 12 beers, your pig drunk and may pass out. I would recommend 4 beers the first time out. This would give you a good feeling for what alcohol is about, but still keep you out of trouble.

These mushrooms will be fairly consistent in potency. They are all grown on the same medium under the same circumstances. If you take 4 average P. cubensis mushrooms, that will put you at the same relative spot on the spectrum as 4 beers. But remember that psilocybin is more powerful than alcohol. What you experience will be more intense than 4 beers. However, on the spectrum of what is possible, you will still be on the low side. What are average size mushrooms? Mushrooms are like snowflakes. No two are the same. I would call a mushroom that has a stalk 3 inches long and a cap 1 inch in diameter average.

Drying the mushrooms as described in this document will have minimal impact on their potency. Many sources claim that dried mushrooms are significantly less potent than fresh ones. If you use the method to dry the mushrooms described in this document, you'll find that claim is not true. It's your choice whether to eat them fresh or in their dry state. Some people have strong feelings one way or the other because of their taste. Most people agree that these mushrooms will never win any culinary awards. Try some each way. Find out if one way or the other is better for you.

Some people find that these mushrooms cause some nausea. AN165023@anon.penet.fi suggests the use of digestive aids available over the counter at any pharmacy. This will make consumption of the mushrooms a lot easier on you if you are susceptible to nausea. Also note, that most people should avoid consumption of alcohol while using these mushrooms. When the mushrooms are mixed with alcohol, even people with cast iron stomachs can loose it.

If you find the taste of these mushrooms particularly distasteful, you can always bury them in a burrito or peanut butter sandwich. If you do this, it will slow the onset of the effects some what. Some people just chew them up and wash them down with orange juice.

Some people dislike the taste so much, they are willing to go to extraordinary measures to disguise the taste. Several popular recipes follow. With the exception of the first recipe, these recipes all suffer from a common problem. They use heat. Heat will cause some of the psilocybin to break down and as a result you will need to use more mushrooms for the same effect than if you had ingested them directly. This fact in and of itself is not too big of a deal. After all, you can grow as many mushrooms as you need. A 25% to 50% loss of efficiency is not ideal, but it may be worth it to some people in order to avoid the nasty taste of these mushrooms. The real problem is it is impossible to predict how strong the effect is going to be. It depends on how hot you heat them when you do the preparation and how long they are hot. Use caution!

### **Mushroom Juice**

Put several spoonfuls of frozen juice concentrate into a blender. Dole's Orange-Pineapple-Banana works especially well but regular Orange Juice or Lemon Aid will work. Add a bit of water, but keep the resulting juice on the strong side. Throw in a few ice cubes and your shrooms (fresh or dry) and whiz on high for a minute or so. Let it sit for a few minutes after you turn off the blender, then drink.

A 500 mg vitamin C capsule can be added and will make the juice more tart which is beneficial in masking the mushroom taste.

### **Mushroom Tea**

Take the fresh mushrooms (6-7 per person depending on size of caps) and cut the caps and stems into very small pieces. Place mushroom pieces into medium sized pot 3/4 filled with water. Boil the water along with the mushrooms. Boil for ten minutes. Remove from the heat and let cool for 10 more minutes. Strain mushrooms with a coffee filter, or paper towel. At this point, if you truly desire tea, a mint flavored version works well. Otherwise, kool-aid is an option. Grape kool-aid mixed stronger than usual will definitely cover the taste. Serve with ice to chill the kool-aid to the desired temperature.

### **Mushroom Soup**

Using Ramen Pride or any other dried noodle soup, follow directions on package, except put cut and cleaned mushroom pieces in the broth. Prepare as usual. If the mushroom pieces are small they are relatively unnoticeable.

### **Mushroom Pizza**

Cook your favorite frozen pizza according to directions. Several minutes before the pizza is done cooking, add finely sliced fresh mushroom pieces to the pizza. Optionally, you can add some grated cheese on top of the newly added mushroom pieces. Adding cheese will help encapsulate the mushroom pieces and dramatically help mask the taste. Place pizza back in oven and cook until done.

**One final note** . If you ever find that you have dosed too heavily, just remember that 90 minutes after ingestion will be the peak experience. Things will start to settle down after that. The good news is that medically you can't overdose on psilocybin. If you remember these things, and believe them, they can help ease you through a high dose experience.