

A Simple Guide to Home Mushroom Growing!

Using the “TOF-DGR04” Deluxe Home Mushroom Growing Kit

Thank you for your purchase of our “Deluxe Home Mushroom Growing Kit.” This is a quick and simple guide designed to get you started growing mushrooms at home. Easy to follow step-by-step instructions will show you everything you need to do from start to finish. It is important to read and understand all of the following information in this guide before proceeding to set up this kit. **Happy Growing!**



©Copyright 2011

Before getting started I would like to take a moment to explain some of the terms and procedures you will need to familiarize yourself with in order to ensure the maximum output of your home growing kit.

Mycology

The word “mycology” is derived from the Greek word meaning "fungus." It is the branch of biology that deals with the study of fungi. A mycologist is a microbiologist who examines various aspects of the fungi kingdom including genetic and biochemical properties, taxonomy and behavior, as well as uses to humans as sources for tinder, medicinal drugs (i.e. penicillin), food (i.e. beer, wine, cheese, edible mushrooms) and entheogens. They also observe the possible dangers of certain cultures that may lead to poisoning or infection.

Mycelium

Mycelium is the vegetative part of a fungus, consisting of a mass of branching, thread-like hyphae or shiro. Fungal colonies composed of mycelia are found in soil. A mycelium may be minute, forming a colony that is too small to see, or it may be extensive. It is through the mycelium that a fungus absorbs nutrients from its environment with which it grows into a mushroom.

Spore

A spore is a reproductive structure that is adapted for dispersal by fungi. Spores form part of the life cycles of fungi. A spore is similar to a seed. The chief difference between spores and seeds as dispersal units is that spores have very little stored food resources compared with seeds. An average mushroom will contain thousands to tens of thousands of spores.

Fruiting Body

The fruiting body or fruit body is also known as the sporocarp. It is the actual mushroom itself, a multicellular structure on which spore-producing structures are formed. Fruiting bodies are termed epigeous if they grow on the ground, as with ordinary mushrooms.

Contamination

As a mycologist, it is critical to fight contamination. Any organism that attempts to get a foothold on your substrate is a contaminant!

To properly incubate your mycelium it must remain at a constant temperature between 70 and 90 degrees depending on what species you are growing. This temperature is also ideal for countless number of other molds and bacteria. In mycology, all growers will experience a contamination of their crops at one time or another, it is almost inevitable. Even experienced growers will encounter an occasional contamination, but if you practice sterile technique, it will greatly reduce your chances of a contamination occurring, ensuring bountiful yield for years to come.

A contaminant is recognizable through the presence of a strange odor or discoloration. If you have a bag or jar that becomes contaminated, it is best to discard it immediately and begin the process again. Little can be done to “save” a contaminated culture, and there are potential hazards to your health if you eat a mushroom that has grown in contaminated conditions.

Sterile Technique--Not Just “Clean”

Some of the procedures you do at home require sterile technique. The purpose of ensuring sterile technique is to prevent infection. The word sterile means, “free from germs.” It is up to you as the mycologist to ensure your work area is as clean and as disinfected as it possibly can be. If you take the proper steps you can greatly reduce the chance of contamination to your product, ultimately producing far larger yields. A few rules for sterile technique to keep in mind are listed here:

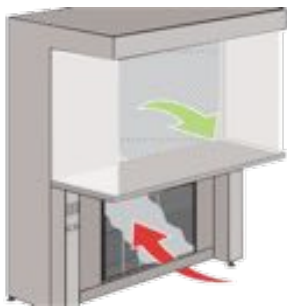
Rules for Sterile Technique:



- Always wash your hands before and after doing any sterile procedure. Short fingernails are important.
- Practice good oral hygiene. Brush teeth, floss and use mouthwash.
- Wear clean and freshly laundered clothes, scrubs, or a lab coat if possible.
- Wear rubber gloves, Tyvek wrist and arm sleeves, a facemask, hair net, goggles, and even shoe covers when possible.
- Sterile supplies must be kept dry. If the outer wrapper is not sealed, the kit is not sterile.
- Prepare a work area by washing the counter or table with disinfectant spray, bleach, or soap and water. Make sure the surface is dry before you put your sterile supplies down.
- The use of a HEPA (high efficiency particulate air) filter, air purifier or laminar flow hood can reduce up to 99.997% of airborne particulates and microbes.
- Special care must be taken when you handle supplies to keep them sterile. Touch only the outside wrapper; only touch the sterile supplies with gloved hands.
- Do not sneeze or cough on the supplies or in the area in which you will be working.
- Try not to reach over the sterile supplies when doing the procedure. It may be best to have your work surface off to your side.

Sterile Field

In mycology, the space in which sterile objects may interact undisrupted by non-sterile objects is a sterile field. An important point to bear in mind is that a person or thing will have only a particular portion of its surface designated as sterile (and therefore within a sterile field). Every other surface is considered non-sterile, and any non-sterile surface may contaminate a sterile surface. Remember, good sterile technique is the first and most important step in ensuring consistent results.



Example of a laminar flow hood



Proper clothing is always a good idea

Getting Started

In the box you should find the following items. Take a few moments to familiarize yourself with them:

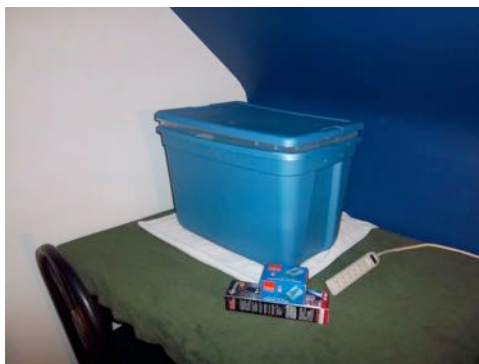
- 1 clear (22x16x12) plastic tote with lid and pre-drilled holes
- 1 blue solid (25x16.5x15.5) outer tote
- 1 plastic bag containing (2) two-pound spawn bags with filter patch (**This bag should not be opened until you are fully ready to inoculate them!**)
- 1 plastic bag containing about two pounds of peat moss casing layer
- 2 aluminum pans with lids measuring $9^{3/4} \times 7^{1/4} \times 2^{3/4}$
- 1 analog thermometer/ hydrometer
- 1 gallon bag of perlite
- 1 air pump with air stone & 4' of air line
- 1 100w aquarium heater
- 1 touch light/ grow light
- 1 pair of rubber surgical gloves
- 1 surgical face mask
- 1 CD with set of detailed instructions

Note: If it is going to be a few days between the time you receive your kit and the time you plan on inoculating the spawn bags, it is best to store them in a refrigerator along with the bags of peat moss. This will slow decomposition of the grain and reduce chance of contamination.

Setting Up the Incubation Chamber

As you know by now, in order for mushroom mycelium to grow they must be kept in a warm environment. This incubation chamber will assure your spawn bags are kept at the right temperature 24 hours a day.

First you must find an area in your home where your kit can be set up. It should be in a place where the temperature will not fluctuate much, away from windows or heating vents, and will not be disturbed. It should preferably be placed close to an outlet and somewhere dark. During the incubation stage, the mycelium will need to be in darkness. That is why the outer plastic tote is not a transparent color. If your incubation chamber is not set up in a dark place, a clean towel or sheet can be placed over it to keep light out.



Note: I have chosen this spot on a table in a corner, next to an outlet, that is not next to a window where outside temperature could effect the temperature of your grow box.

1. Clean your grow area, and plastic totes thoroughly with a disinfectant.
2. Placing a clean towel under the grow box will help hold in heat and catch any water that might be spilled in the filling process.
3. You will need exactly 5 gallons of warm water in the blue tote. Fill just enough that the water line reaches the bottom of the clear tote. Add about ¼ cup hydrogen peroxide to the water in order to help keep it clean.
4. The best position for the heater is to attach it to the side of the blue tote a few inches from the bottom so that the heating element will not come into direct contact with the sides or bottoms of either of the plastic totes. Position the heater so you can see the light and temperature gauge. Make sure you do not turn the heater on until it is in the water, as this could damage it. Also, if removing the heater, be sure to unplug the heater from the wall and let it sit in the water for 20 minutes before removing it. Again, be certain that the heating element is NOT in direct contact with either of the totes. See the instructions that come with the heater for more details.



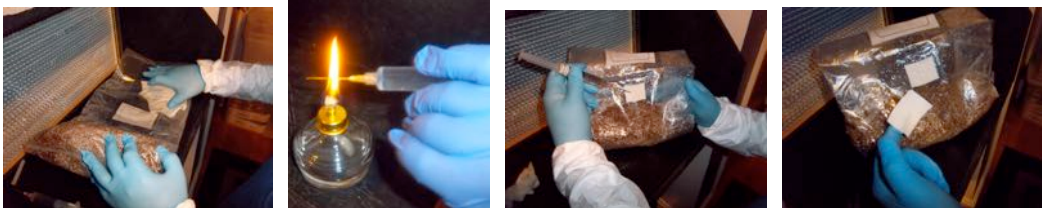
5. Attach the airline to the bubble stone and place stone in the bottom of the blue tote. This will help circulate the water, preventing it from becoming stagnant.
6. Place the clear tote inside the blue tote.
7. Attach the other end of the airline to the air pump. The best place to position the air pump is on the lid of the clear tote. Be sure that the air pump is never below the water line, as water could back flow into the air pump and ruin it. Please see the instructions that accompany the air pump for more information.
8. Read the directions on the thermometer/hydrometer, install battery, and place **inside** the clear tote.
9. Plug in your heater and air pump. I have chosen to plug them into a surge protector with a breaker switch. It is always a good idea to use caution when dealing with electronic devices around water.

Note: For best results fill the tote with warm water, and turn the heater up to the maximum setting until the thermometer inside the clear tote reads 86 degrees Fahrenheit. Then, reduce the temperature on the heater to read 86 degrees. This may take some tweaking between the thermometer and the heater before you get the temperature to remain a constant 86. It could also take up to 24 to 48 hours before the water heats up to the correct temperature.

How to Inoculate the Spawn Bags:

All work should be done in front of a laminar flow hood if possible. This will greatly reduce the chance of contamination

1. Make sure your hands are clean and you are wearing clean, freshly laundered clothes
2. Clean your work area thoroughly with a disinfectant such as bleach or Lysol; wipe the bag and your work area down with rubbing alcohol and spray an air sanitizing spray like Oust or Nutra-Air. Leave your work area for a few minutes to let the disinfectant settle.
3. Put on your gloves and wipe them with rubbing alcohol.
4. Make sure you shake your spore syringe to disperse the spores.
5. Carefully open the white bag that contains the (two) two-pound spawn bags. I would suggest tearing the bags and not cutting them with scissors or a knife because of the risk of cutting the spawn bags and rendering them useless.
6. Pour a small amount of rubbing alcohol on a paper towel and wipe the spawn bags down to remove any excess moisture that may have accumulated on the outside of the bags during the sterilization process.
7. Wipe the injection point with alcohol.
8. You will need to flame sterilize your needle then wipe the needle with an alcohol wipe. This will cool it down immediately as well as keep it sterile. Now, poke the needle through the tape at the injection point.
9. You will only need to use 2-4 ml of your 10 or 12 ml syringe. Have another piece of tape handy to cover the injection hole as you withdraw the needle. Wipe the tape with alcohol one more time for good measure.
10. Shake the bag gently to disperse the spores.
11. Place your bag in the incubation chamber (the clear tote). Mycelium will incubate anywhere from 70-86 degrees Fahrenheit depending on the specific strain.
12. You may want to mix up the contents of the bag after about 5-8 days or until around 30% to 40% is colonized. Be careful not to disturb the bags too much. I have found in my experience that shaking the bags too often will kill or slow mycelium growth.
13. Allow the bag to fully colonize. You will know this has happened when your grain has turned completely white. This should take 10-16 days if kept around 86 degrees.



Fruiting the Mycelium

Once fully colonized and consolidated you can transfer the substrate to the fruiting trays and place them in a fruiting chamber.



A fully colonized spawn bag.



Pour the bag into the tray

1. Ensure you complete these next steps in a sterile environment.
2. For good measure, wipe the foil trays and the bags down with rubbing alcohol or disinfectant.
3. Gently unfold the spawn bag and carefully mix the contents, breaking up large clumps. It is important not to break up or disturb the mycelium too much because this will cause bruising and lead to the mycelium dying.
4. Cut the top off of the bag and pour the contents into one of the foil tray. One bag should fit perfectly in one tray. Spread out the spawn evenly in the tray. (Figure 1)



Figure 1



Figure 2



Figure 3



Figure 4

5. Next, open the sterile peat moss. Spread the peat moss on top of the colonized grain. This is the “casing layer.” The layer should be approximately a quarter to half an inch thick. Be sure there is not a very thick layer, as this will inhibit the growth of your mushrooms. See the difference between figure 2 and figure 3 to get an idea of the casing depth.
6. Place the lid on the foil container and place back in whatever area your incubation area. It will still need to incubate at 86 degrees for 5 to 7 days. (figure 4)
7. After 5 to 7 days, carefully remove the lid from the foil container. You should notice at this point that mycelium is overlaying the casing layer. The casing layer should not be 100% colonized in order to fruit.

Converting the Incubating Chamber to a Fruiting Chamber

At this point in the growing process, it is necessary to change two factors in the growing environment: humidity and temperature. For the last few weeks, the mycelium has been incubating at 86 degrees. The correct temperature for mushroom fruiting is between 65 and 76 degrees. The humidity level needs to be as close to 100% as possible. The water in the fruiting chamber will help achieve this.



1. Unplug the air pump and heater (remembering to let this heater sit for 20 minutes before it is removed from the water.)
2. Remove the clear tote from the solid outer tote and empty the water from the solid tote. The solid tote is not used for the remainder of the growing process.
3. Pour the bag of perlite in the fruiting chamber, and spread it out evenly.
4. Fill the fruiting chamber with around 1-1½ gallons of water you do not want the water level to come above the perlite. Adding a tablespoon of peroxide to the water will help keep it clean.
5. Place the bubble stone attached to the air pump at the bottom of the fruiting chamber under the perlite and position the air pump outside of the chamber. You can run the airline through one of the predrilled holes. This will produce fresh air to the mycelium, and help prevent the water from becoming stagnant.
6. Place the aluminum containers in the fruiting chamber, on the perlite, and remove the lids from the aluminum containers. Replace the lid to the fruiting chamber.
7. Mushrooms require light for different reasons than plants. They only require 4 to 6 hours of indirect light per day. If the plastic tote is not placed in an area that will receive indirect light, use the enclosed touch light, placing it adjacent to the fruiting chamber, as a lighting source.

8. Once again, ensure that the fruiting chamber will be placed in an area that will be between 70 and 76 degrees, which should be normal room temperature. The heater is no longer necessary at this point.
9. After 24 hours of setting up your fruiting chamber, you should notice water droplets forming on the interior walls of the plastic tote. This is a good sign that you are achieving proper humidity levels. If you wish to check humidity levels, place the hydrometer inside the fruiting chamber, making sure that it is not submerged. It is best not to leave the hydrometer in the fruiting chamber for the entire fruiting process as it may become damaged.
10. It is best to disturb the fruiting chamber or remove the lid as little as possible.
11. After 14 to 16 days, you should notice the beginnings of fruit bodies growing. Depending on what species you are growing, a mushroom can grow from a small pin to a full mushroom in as little as 48 hours from this point.

Once your trays are full of mushrooms, pick them by gently twisting the mushroom at the base. If you keep the roots in tact they will continue to grow back. This will be your first “flush.” Leave the aluminum trays in the fruiting chamber because more fruit bodies will continue to grow in the next few days. Each tray should flush 3 to 6 times before the mycelium is “spent.”

By now, you have completed your first harvest using our “Deluxe Home Mushroom Growing Kit.” This kit can be reused for future harvests. If you need to purchase more sterile spawn bags of rye grain, please visit our eBay store. We wish you the best of luck with your mushroom growing!!!



Tons of Fun Gi™