



# MIDWEST GROW KITS

Midwest Grow Kits Mushroom Grow Guide Revision 7.0 2019/2020

## The Mushroom Growing Guide

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### Some important information on to know before you get started:

- » All of our Jars and Spawn bags are shipped fresh and should be used within 4-6 weeks of arrival. To store them longer, they should be kept in the fridge. Do not freeze.
- » Jars will arrive pre-sterilized and ready to use. You may notice some brown circles on the foil. This is a normal reaction from aluminum and heat. The jars are stacked vertically during the sterilization process.
- » Please tighten the lids while unpacking. The jar lids have a tendency to loosen up from the shipping vibrations. For the 12 packs, slide the case out of the bubble bag, hand tighten each jar while they are still in the box. For the 6 Jars, open the top of the bag and one by one tighten each jar, then remove. Always leave the foil on until inoculation.
- » Your spore syringes should be stored at room temperature. They should be stored in a dark, dry area. They can last up to 12 months or longer. Spore prints will not work with our jars or bags. You must use a spore syringe. For more information on spores and recommended spore vendors visit our Q/A tab on our website.
- » You can grow different spore strains in the same kit, as long as they are a similar species that require the same growing temperatures and parameters.



# Preparing your workspace

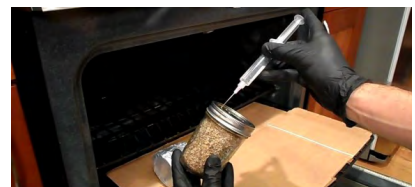
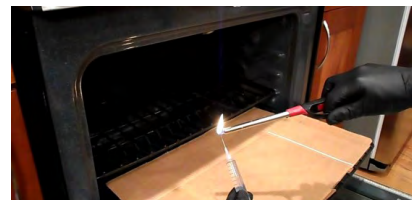
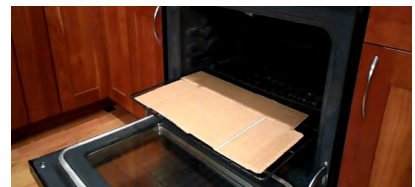
Inoculating your jars is the main step where contamination is possible, and thus must be done in as clean of an environment as possible. If the room you're working in is clean enough, (most are not) you can get away with inoculating them in open air. The needle of the syringe can carry bacteria and spores from other molds into your cake, contaminating and ruining the cake. The open air of your home is filled with millions of microscopic mold spores and bacteria, so even one of these falling on the needle of your spore syringe can infect a jar. For this reason, absolute sterility of your needle is extremely important.

Wash your hands and face with a bacterial soap. Wear clean clothes. Anything in the area of the syringe and jars could contaminate your cakes if it is not clean. There are two methods of injecting your spores that help eliminate any possible air contaminants. We highly recommend using one of the two methods listed. 99% of the time people fail is because they "thought" the space they were using was clean and did not use a sterile spore injection method. Turn off all air conditioning or heating. The least amount of moving air in your workspace the better.

## Method 1: The Oven Door (The easiest & most used method for over 10 years and counting)

The oven door inoculation technique is one way to inject spores into your jars. This method is one of the oldest methods using hot rising air to keep contaminants away from you. Although the science behind it is always debated, it's our favorite!

- » Turn off all household heat and AC and close all windows. Make sure the air is very still in the kitchen. Spray Lysol Disinfectant spray (Optional) around your work area and let settle and dissipate. Next, turn on the oven and pre-heat to 325 degrees. This will sterilize your oven. Once oven has reached 325 degrees, leave it at that temperature for 20 minutes, then lower the temperature to 250-275 degrees. After 10 minutes at this temperature, you can begin the inoculating process.
- » Pull out the lowest rack and place a small piece of cardboard or something solid that you can work on. Next place the jars on the rack or next to the oven on the floor in reach. Remove the foil from the jars.
- » Sterilize the syringe with a lighter and alcohol swabs. Make sure you flame the syringe after every few jars, just for a second or two. Use the alcohol swabs to remove any debris stuck to the needle.
- » Inject each jar reaching into the oven. Once done with the jar, replace the foil loosely and set aside, outside the oven.



This method works very well in all our testing and is very simple compared to the Still Air Box method. If you have a friend to help, you can use that person to hand the jars to after you inject them and re-cover with the foil. Do not let the jars get very hot sitting in the oven. (This method is tried and tested. We have been using it and recommending it for years and the success rate is over 99%.)

## Method 2: The Still Air Box

- » Another recommended inoculation technique is to make a “glove box, or Still Air Box”. An enclosed, semi-sealed box with holes for gloves to go through and a clear top. A cheap, halfway decent one can be built for only few dollars. All you need is a large cardboard box, (or plastic container) some tape and saran wrap to go over the top of the box, and a pair of new, unused dishwashing gloves.
- » Tape saran wrap over the open top of the box or container. Next, cut two holes in the sides, big enough for your arms to fit through. Tape gloves to the two holes, making sure the holes are completely sealed so no “outside” air is getting into the box. A small flap can be cut into the side of the box for getting the syringe and jars into and out of the box.
- » Disinfect the gloves and inside of the box with Lysol disinfectant spray. Once the interior is thoroughly sprayed with Lysol, let the air settle for 10 minutes, stick your hands into the gloves and begin injecting your jars.



## Method 3: Open Air Method

The last method of injecting your jars that we want to mention is to sterilize a small closet with Lysol Disinfectant aerosol spray or fully clean a small bathroom. Turn off AC or furnace and place a towel or similar item to seal off any places where outside air can circulate in. The success rate varies because every space can have a different level of mold and bacteria present in the air. When using an “open-air” spore injection technique, the key to success is using an alcohol lamp or butane lighter and constantly flaming the needle before the needle goes into every hole. Keep air movement to a minimum while inoculating. Use an alcohol swab in between jars to clean the needle. Work fast!

## Inoculation

Begin carefully inoculating your jars with the syringe. It’s a good idea to have a lighter or alcohol lamp handy as well to sterilize the needle as you go. Flame the needle until there is a faint red glow, then carefully squirt a little bit of spore solution (if you can spare it) to cool down the needle before sticking it in the cake, usually 3-4 seconds. Putting a hot needle into the cake will get burnt-on rice all over the needle and also potentially kill the spores! Use the alcohol wipes included on the needle in between each jar you do.



# Spore Injection

Once you're ready to inoculate, shake up the spore syringe to get as many spores as possible off the sides of the syringe and into the water. After you sterilize your needle, carefully remove the cap over the syringe needle. Slide the needle into the first hole in the jar lid. Push it all the way in so it passes through the  $\frac{3}{4}$  inch top dry layer of vermiculite. Angle the needle toward the glass so you can see the end and verify that a few drops of spore solution came out. Gently squeeze out a few drops in each hole. You will end up injecting 1-1.5 cc of spore solution into each jar, splitting up the amount you inject between 4 holes. Be careful that nothing but the jar and substrate touch the needle, and re-cap it immediately after using it to avoid contaminating the needle. We recommend flaming the needle in between each jar you do. Also, be careful of using too much spore solution. Using more than you need is simply wasting. With spore syringes, it can be easy to accidentally push the plunger on the syringe too forcefully and dump out way too much solution.



*Angle the needle so you can see spore solution come out when injecting.*



## Spore Tips

Some spore vendors use much higher concentration of spores than others. This can lead to large amounts of spores clumping together which can potentially clog the needle. Make sure you spend a few minutes shaking vigorously to help break up these clumps. If you are having problems with your syringe clogging, instead of pushing harder to clear the clog use a small mallet or similar object to tap the end of the plunger in short quick blows. Start with light taps and then increase the force until the clog clears. Doing this prevents accidentally injecting a large amount of solution into the jar.



After injecting, you can leave the foil off if you don't plan on touching them. If you would like to handle them, to check the progress often, leave foil on and make a little foil dome. This will allow some gas exchange but also add another layer of protection. We recommend leaving the foil this way throughout the incubation timeframe. During incubation the jars need minimal gas exchange. Opening the incubation chamber and fanning it out once or twice a week is plenty.

## Mycelial Growth Phase– Incubation Period

The jars are now ready to be incubated at about 75-78 degrees F for several weeks. If you have the Ultimate or Mega Kit, this is a good place to read the setup guide to get your incubator ready. If you have the Simple Kit or just the jars you will need to find a warm room or some other source of heat to keep them in that temperature range. Be careful not to use any heat source that could cause fires; if they get too cold, their growth will slow considerably, and if they get too hot, they will lose water and eventually die. (They will usually die if they ever get above 105 degrees F) Mushrooms will colonize at lower temps but very slowly. Any temps less than 68 degrees, they will probably not colonize. There are some bacteria that thrive in temperatures over 82 degrees so the rule of thumb is to strive for mid to high 70's. We find this the perfect temperature for speed of growing and lowest chance of contamination.

# Mycelial Growth Phase

The first signs of mycelial growth should appear within 5-9 days. If none appear within two weeks, something went wrong. (Perhaps the heat killed the spores, or the spores simply did not make it into the cake.) Most types of mushroom mycelium will be a brilliant white fuzz, often growing in ropy strands. This ropy type of growth is called rhizomorphic growth, and is a sign that the mycelium will probably fruit very well. Any other color is usually mold and a sign of contamination. A contaminated cake will not recover and, except in very rare instances, will never produce mushrooms.

**Please note that certain strains of mushrooms can have a bluish tint to them and is normal.**



Colonizing jar showing rhizomorphic growth



100% completely colonized 1/2 pint jar



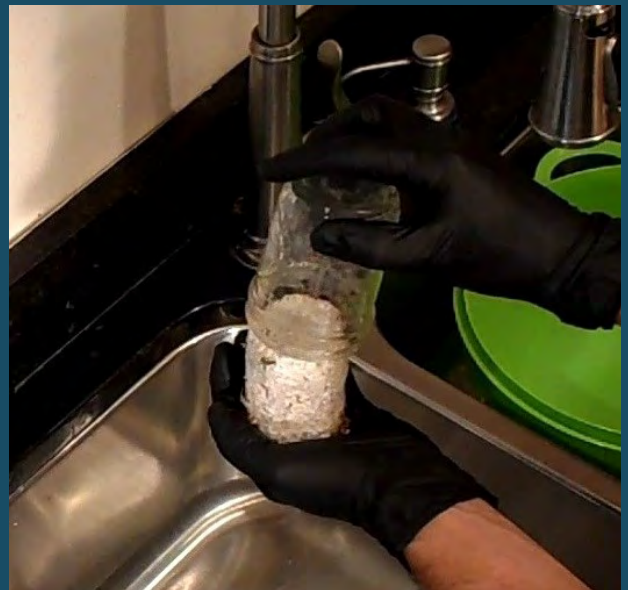
A contaminated jar with purple & yellow mold

## Birthing the Cakes

Once a cake is completely covered in white mycelium usually around 4-5 weeks, wait at least 2-3 more days before taking the cake out of the jar. This allows any unseen mycelium to finish colonizing.

When you are ready, and in a fairly clean room, begin transferring the cakes from their jars into their fruiting chamber. Remove the band from the jar, slowly turn the jar upside down, so that the cake is resting on the jar lid. You may need to gently tap the jar to knock the cake loose. Sometimes a rubber mallet is needed to lightly tap the bottom of the jar to dislodge stubborn cakes.

Take the cake out of the jar and then carefully pick up the cake and turn it over so it is sitting right side up on the lid or small piece of aluminum foil. We usually recommend wearing gloves when handling the cakes, although once a cake is fully colonized they have their own immune system and are very resistant to molds and bacteria.



# Dunking



After you “birth your cake” you will want to re-hydrate your cake. Place the cake into a slider zip lock bag, 1-quart size is perfect. Fill the bag with water (bottled spring water or filtered water is best) Place the cake in the bag, seal off any air in the bag by slowly zipping the bag closed and removing air as you go. Do this for each cake in its own bag. We recommend placing the bags into a big bowl or pot to avoid any leakage issues.

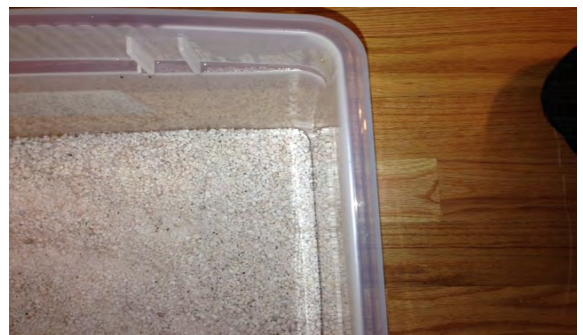
**We recommend separate bags for each cake to avoid any cross contamination in the case you have any issues with one. If you are certain all the jars look healthy you can use a larger gallon size Ziplok slider bag with multiple cakes per bag.**



Next you want to let them soak for 18-23 hours. Do this after every Flush. Do not exceed 23 hours in the water. Place back in fruiting chamber. Within 4-7 days it will start pinning and producing more mushrooms. Some people like to dunk right after they birth them, but others like to wait until after the first flush of mushrooms. This is up to you! If you want a batch of mushrooms right away then dunk after the first flush. If you can wait, we recommend dunking right after birth. When dunking for the second or third time a great tip is to place the bags in the fridge for the dunking process. This cold shock can help trigger stubborn cakes to re-start the mushroom producing cycle again without any harm to the cakes.

## Fruiting Your Mushrooms - The Fruiting Chamber (Terrarium)

Line the bottom of the fruiting chamber with damp perlite. A common mistake is to get the perlite too wet. This will end up turning into a swamp of water and perlite. Not only is this hard to clean up, but will also drown your cakes. Get enough perlite to make at least 1.5”-3” (2.5-4.5 cm) thick layer on the bottom of the fruiting chamber. Put it into a colander, strainer, or cloth enclosure (pillow case) that it can’t slip out of. Wet it thoroughly with normal tap water. Let the water drain out. Then, move the perlite into the fruiting chamber and smooth out the surface. You now have a layer of damp perlite that will keep the humidity in the chamber high enough for the cakes to fruit. By the time your cakes have stopped producing mushrooms, the perlite might start having a skunk-like smell. If you want to re-use it, put it in a baking pan and cook it at 350 degrees in your oven until it is dry. Let it cool, and it’s ready to be used again. You can also add some Hydrogen Peroxide to the wet perlite to help it stay clean a bit longer. You will need to add water every week to the perlite to keep it moist. Some people recommend 4” of perlite but we have tested this and 1.5”-2” works perfectly.





Pinheads forming on cake



Young mushroom



Veil being torn by knife



Underside of cap with veil torn

» Mushrooms will grow at many different speeds. They love to grow close together and grow around each other.

Some cakes will grow faster than others. This is completely normal!



» The picture to the right is an example of jars on top of the perlite. The top row have been dunked and rolled. (See previous section) The bottom row have been double end cased, which is adding moist vermiculite to just the top and bottom. The two jars on the right side have been dunked but no extra vermiculite added. In our experience there isn't one particular method that is better than the next, but adding vermiculite does help the cake last longer between dunks without drying out.



## Inducing Fruiting (Producing Mushrooms)

In order to initiate fruiting, three main conditions must be met for the cakes; First, they need light. Room light, indirect sunlight is best but daylight spectrum LED lights and fluorescent lights contain lots of blue light which work very well. The plug in dual spectrum light in our kits has the ideal spectrums to induce mushroom pinning and encourage growth. They also need a very high humidity environment. 85-99% humidity. Lastly, it is a good idea to lower the temperature range 2 degrees lower than your incubating temperature. (If possible) to about 75-77 degrees F. Like the light, this signals the cakes to begin fruiting. However, most popular strains fruit so easily that lowering the temperature is not absolutely necessary. Many types of gourmet mushrooms like fruiting in lower temperatures. Brown Beech, Black Poplar, and King Stropharia wprefer temps around 68-72 degrees for fruiting.

## Pinning, Fruiting, and Harvesting

For the first week to 10 days, the cakes will generally not do anything. Then, very small bumps, called "pins," "pinheads," or primordia" will begin to grow out of the surface of the cake. These are the beginnings of mushrooms. Many will never grow any larger. However, some will grow until they are full-grown mushrooms. A mushroom is ready to be picked when the edge of the cap tears away from the "stem" (the stem of a mushroom is called the stipe). Often, there will be a thin veil between the cap and stipe. If this is present, you can wait until the veil tears before picking the mushroom. To pick a mushroom, grasp it near the base where it is joined to the cake, and gently twist it until it comes off. Immediately begin the process of preserving it, either by refrigerating it or by drying it. Mushrooms will begin to rot immediately. Each cake will produce about 1-3 waves or "flushes" of mushrooms, normally with 2-5 days of dormancy between flushes. After about a month or so of fruiting, most cakes will be spent, and will not produce any more mushrooms unless rehydrated by dunking underwater for 18-23 hours. If they turn dark blue or green, this means they are done growing and should be thrown out.

## Aborts

Some of the pinheads will begin to grow, then suddenly stop before they become full-grown mushrooms. These are known as aborts (aborted mushrooms). Aborts are just as good for eating as full-grown mushrooms, but they must be picked before they begin to rot. A mushroom that has mold growing on it or which has black goo in the center of the stem is rotten and is not safe to eat. It is often difficult for beginners to identify an aborted mushroom before it begins to decompose. Early warning signs include a halt in growth of the mushroom, and a greenish tinge around the dark colored tip of the primordia that will eventually become the cap of the mushroom. Always completely remove aborts from the cake, even if they are too rotten to eat, because they can get moldy and cause the cake to get infected.



## Preservation Methods

### Refrigeration

If you will be consuming your mushrooms fairly soon after picking them, you can keep them in your refrigerator, in a paper bag. Don't use a plastic bag to store fresh mushrooms, this will cause them to mold. Fresh mushrooms are reportedly stronger than dried ones, but can be more difficult to measure or dose. Also, a fresh mushroom can have a varied taste depending on which strain was used and under what conditions it was grown.

### Drying

The best way to preserve mushrooms is to dry them as soon as possible after picking. It is very important when drying that the mushrooms never be exposed to heat, or heat-sensitive chemicals that will break down if exposed to heat. The best method of drying is to put the mushrooms in an enclosed container, like a covered bowl, that also contains some desiccant. We offer a drying kit that includes the needed materials for this method. Most varieties of mushrooms will emit a strong "mushroom" aroma during the drying process. If this is a problem we recommend using a drying kit to keep the smell inside the container.

### (Slow drying methods)

Another way to dry mushrooms is with the use of moving air. Simply place them in front of a fan (not a heater), and the moving air will dry them in about a week. An even easier way to air-dry mushrooms is with a food dehydrator. If the dehydrator doesn't have a switch for turning off the heat, you will need to take it apart and disconnect the heating element, making sure to take any necessary safety precautions. Air-drying will not always remove all of the water from the mushrooms. The drying process can be accelerated substantially by slicing the mushrooms lengthwise into halves or quarters, thus increasing the surface area of each mushroom. The best overall method for drying mushrooms is to first dry them using moving air, then, if necessary, put them into the drying kit to remove the last little bit of moisture that remains in the mushrooms. You want your mushrooms to be bone dry and brittle. If they feel flexible, they are probably not totally dry. Store the dried mushrooms in a sealed container with small desiccant packs, away from heat and light. For long term storage we recommend our Hygrolid Mushroom Drying system. Questions? Growing Help? Email or Call! We are there for you! [support@midwestgrowkits.com](mailto:support@midwestgrowkits.com) (800) 921-4717 11am-5pm CST Mon-Fri



**Completely dried mushroom**

