



MIDWEST CROW KITS

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Thanks for purchasing one of the easiest Kits to grow mushrooms!

Our Mushroom Grow Guide has been updated for 2012!

Please read this guide a few times! Don't forget the last page that has tips and tricks to get the most out of your growing experience!

Things to know before you get started:

- Each jar requires approximately 1 cc of spore solution divided up evenly between each of the 4 holes.
- Mushrooms grow at night and during the day. Mushrooms are not like plants which need an abundance of light to grow. Light is a trigger mechanism to tell them to start producing mushrooms. During the first stage where they are colonizing, you generally want to keep them in the dark. Once they are around 75% colonized you can introduce light. Daylight from the window is always going to be the best source of light.
- You can grow different strains in the same kit, as long as they are a similar species that require the same growing temperatures.

Here is where you start! Follow this guide exactly!

Inoculation

Cleanliness Precautions

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, if not absolutely sterile, 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. Wash your hands and face with antibacterial 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.

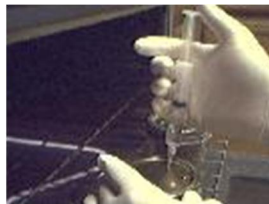
1. Glove Box Method

A good way to accomplish this is to make a "glove box," an enclosed, semi-sealed box with holes for gloves to go through and a see-through top. A cheap, halfway decent one can be built for only a couple bucks worth of stuff. 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 top and cut two holes big enough for your arms in the sides. Disinfect the gloves and the inside of the box with Lysol spray disinfectant. A small gate can be cut into the side of the box for getting the syringe and jars into the box, or they can be put through one of the arm holes (if you choose not to attach the gloves to the holes). Once the interior is thoroughly sprayed with Lysol, let the air settle, stick your hands into the gloves and begin injecting your jars.

2. Oven door method (our preferred method)

The oven door inoculation technique is another way to inject spores into your jars. This method works on the principle of rising hot air will lift mold and contaminants away from the jars. First, spray Lysol disinfectant in the oven and around the work area. Pre-heat the oven to 300 degrees. This will pre-sterilize your oven first. After oven has pre-heated to 300 degrees for 20 minutes, lower heat to 250-275

Pull out the lowest rack and place the jars on the rack. Remove the foil from the jars. Sterilize the syringe with a lighter or alcohol swabs. Inject each jar reaching into the oven. You will notice the heat rising in your face. Simply remove each jar from the oven as you go. 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. This method works very well in all our testing and is very simple compared to the glove 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. You are using the hot rising air as your workspace. This method is tried and tested. We have been using it and recommending it for years and the success rate is over 99%.



Inoculation: Cleanliness Simplified

Begin carefully inoculating them with the syringe. It's a good idea to have a lighter handy as well to sterilize the needle as you go. Flame the needle until it gets very hot, 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. Putting a hot needle into the cake will get burnt-on rice flour all over the needle. You can also use the alcohol wipes included on the needle in between jars



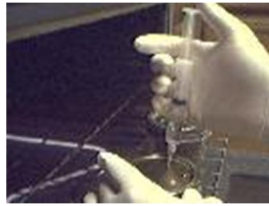
Sterilizing the needle with flame

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. Carefully remove the cap over the syringe needle and slide the needle into one of the holes in the jar lid. Shove it all the way in, so that the needle goes into the cake itself. Gently squeeze out about 0.5-1.5 cc of spore solution into each jar, splitting up the amount if you inject through more than one hole. Some people suggest using an entire cc of solution per jar, however we have had great success with only .5cc each. 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. Also be careful of using too much spore solution as 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. Once each jar is inoculated, it is ready for incubation. There is no need to put tape over the holes in the lid, because the dry vermiculite will keep out any contaminants.



Spore Injection



Spore Injection



Spore Injection

Mycelial (Vegetative) Growth

Incubation

Now the jars are incubated at about 77-85 degrees F for several weeks. If you have the Ultimate or Mega Kit, this is a good place to incubate your jars. If not, you will need to find 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 under 68 degrees will probably not colonize.

Mycelial Growth

The first signs of mycelial growth should appear within 5-8 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.) This type of mushroom mycelium will always 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 of mold, is a sign of

contamination. A contaminated cake will not recover and, except in very rare instances, will never produce mushrooms.



A colonizing cake displaying rhizomorphic mycelial growth



A completely colonized cake in a 1/2 pint jar



A cake, contaminated with a green mold, in a 1/2 pint jar

Fruiting (Producing Mushrooms) and Harvesting

The Fruiting Chamber (Terrarium)

Place cakes into the growing chamber provided. Light must be able to shine into the terrarium, doesn't matter what direction it comes from. Using room light is great, but if you must use the battery grow light, place it anywhere you'd like. Light simply triggers the mushrooms to begin the growing process.

Our Ultimate and Mega kit use a forced air system which integrates an electric air pump and filter to provide the cakes the oxygen and gas exchange needed. No drilling of holes required.

When using the simple grow kit, there is a method called the shotgun chamber where you drill holes about 1" apart around the entire chamber to provide fresh air to the cakes. This is a good method if you are not going to be around to open up the lid and fan out the inside to allow fresh air in. (This is not needed on any kit that includes an air pump)



Simple kit fruiting chamber

Birthing the Cakes

Once a cake is completely covered in white mycelium, wait at least 2-3 more days before taking the cake out of the jar. When you are ready, and in a fairly clean room, begin transferring the cakes from their jars into their fruiting chamber (described in the next step). Remove the lid of each jar, and dump out the dry vermiculite on top. Then, put the lid back over the top of 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. Take the jar off the top of the cake and then carefully pick up the cake and turn it over, so it is sitting right side up on the lid. Put them it into the fruiting chamber. Once all the cakes have been transferred, you're ready to induce fruiting.



Cakes in terrarium seen from above

Inducing Fruiting (Producing Mushrooms)

In order to initiate fruiting, three main conditions must be met for the cakes: First, they need light. Only a dim light is needed. LED lights contain lots of blue light which work very well. Second, they need a fairly high humidity. 85-95% humidity is a good range for fruiting.

Line the bottom of the fruiting chamber with damp perlite. A common mistake is to get the perlite too wet, and end up with a swamp of water and perlite that is very difficult to clean up, and will drown the cakes. Get enough perlite to make at

least 1-2" (2.5 cm) thick layer on the bottom of the fruiting chamber, and put it into a colander, strainer, or cloth enclosure that it can't slip out of. Wet it thoroughly with normal tap water, and 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 the cakes can be set directly on, and which 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 getting a little bit skunky smelling. If you want to reuse 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 4ö of perlite but we have tested this and 1-2ö works perfectly.

Lastly, it is a good idea to lower the temperature range a bit, to about 75-78 degrees F. Like the light, this signals the cakes to begin fruiting. However, most strains fruit so easily that lowering the temperature is not absolutely necessary.

This is the time where you can decide to dunk your cakes or go ahead and fruit the first batch. Dunking will yield more mushrooms for the first flush but will take them 7-10 days to recover and start pinning. So if time is not a concern we recommend dunking after birthing. See our section at the end on dunking for exactly how to do this properly.

Another popular method is after dunking, roll the cake in dry vermiculite and then mist the cake with clean water providing extra moisture. This is optional and does require extra vermiculite. This method is called the "dunk and Roll". We have not seen much difference between just dunking and actually rolling them in dry vermiculite, so we leave this up to you to decide.

Pinning, Fruiting, and Harvesting

For the first week or two, 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 24 hours,



Close up of pinheads and primordia growing from the top of a cake



A young mushroom with the edges of the cap pulled away from the stipe



Veil being torn with a knife



Underside of cap with veil torn away



Two cakes beginning to grow young mushrooms



Cakes with growing mushrooms and primordia



Very mature mushrooms fruiting from a cake. Note the upturned edges of the cap on older mushrooms.



Many cakes fruiting

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.



An abort at the base of a cake

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 dose. Also, it should also be noted that some people like the taste, and that the flavor of can vary 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, are heat-sensitive chemicals that will break down if exposed to heat. You can get away with drying them in the sun, but expect some loss in potency. Another common 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.

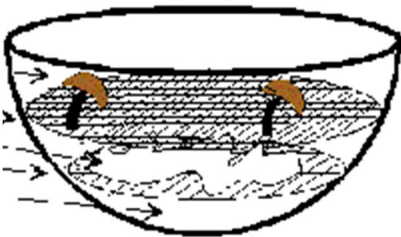


Diagram of desiccant chamber



Photo of desiccant chamber



A completely dried mushroom cap and stem

(Free drying method)

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 very quickly. 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 is by far the fastest way to dry mushrooms, but 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 a desiccant chamber 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, away from heat and light. You can make sure that they stay dry by putting some desiccant into the storage container with them. The little desiccant packets that come in vitamin bottles will work to some extent. You can also make your own desiccant packets by wrapping up about a teaspoon of desiccant granules in a paper towel and securing the packet with rubber bands or tape.

ENJOY!

Tips, Tricks and Hints to get the most out of your Grow!

1. Inoculation: When injecting the Spore solution into the jars, make sure the area you are working in is as clean as possible. Spray Lysol Disinfectant Spray all over your area first. Make sure there is as little air movement as possible. Turn off all fans and A/C units.
2. Angle the needle toward the glass so you can see the liquid from the syringe come out, this ensures you got spores in each hole.

3. Sterilize the Syringe needle with a lighter for a few seconds before injecting the spores. Do this every few jars. Shake the spore syringe every few jars to mix up the microscopic spores. Use the alcohol wipes if you end up with vermiculite on your needle
4. Incubation period: Make sure the jars are at 77-82 degrees. This speeds up the Jar growth period. The first signs of growth in the jar should come at 4-7 days. If you have the simple kit place the jars in an area where it's at least 76-78 degrees. Lower temps are ok too, but it will slow the growth.
5. Daylight or roomlight is best! Indirect light is all that is needed for mushrooms to grow. Use the lights provided if growing in a dark closet or an area that will not get room light or daylight.
6. **Dunking** : After you birth your cake after 100% colonization, you will want to re-hydrate your cake. Place the cake into a zip lock bag, 1-quart size is ok. Fill the bag with water (bottled water or filtered water is best) Place the cake in the bag, seal off any air in the bag and put the bag in the fridge for 16-20 hours. Do this for each cake in its own bag. This does 2 things: It triggers the cake to start producing mushrooms due to the cold temp. It re-hydrates the cake to produce many more mushrooms. Do this after every Flush. Do not exceed 23 hours in the water. Place back in Fruiting chamber. Within 3-5 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 dunk after the first flush, if you can wait, do it after birth.
7. When drying your mushrooms, the easiest way is to just blow a fan on them. Any fan will work, just cut them down the center and blow a fan on them for 24 hours, they will dry out quickly and be ready to store.
8. Save the extra dry vermiculite that comes out of the jars when you remove them. After placing all your jars in the fruiting chamber, sprinkle a layer on top of your cake and drip some

water on the vermiculite. The mushroom cake will absorb the water slowly and help grow larger mushrooms. This is why you see a lot of pictures with the cakes having a brown top layer while in the growing chamber. It's a little added moisture for the mushrooms to feed off. The cakes do not like getting wet, they absorb moisture from the air or other substances. So be careful not to pour too much water on the vermiculite.

Need help? Questions?

Email us at support@midwestgrowkits.com

Live Grow help chat available!

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