MYCELIATED GRAIN TEK

1st Edition

The recipes and methods described in this document are the property of NO ONE.

This document is a compilation of information gleaned from personal experimentation and combined with preexisting knowledge. This is the definition of TEK (Traditional Ecological Knowledge)

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1597, 2584, 4181, 6765, 10946, 17711, 28657, 46368, 75025, 121393, 196418, 317811...

First Published 2019

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Introduction

It has been found that the mycelium of certain species of potent psilocybin-bearing mushrooms of the genus *Psilocybe* also produces considerable quantities of active material when cultivated on sterilized, edible grain media (or "grain-spawn"). The grain-spawn is inoculated and incubated in glass canning jars or polyurethane bags specially designed to tolerate sterilization temperatures. The resulting myceliated grain is then dehydrated and easily preserved long-term if properly stored. The whole dried kernels may be simmered in water to create a potent tea, or ground to create an easily digestible flour (depending on the particular grain used). The two species known with certainty to produce active compounds in sufficient quantity are *Psilocybe caerulescens*, and *Psilocybe hoogshagenii/semperviva*, though it's likely that many others may be found to be equally effective once further research has been conducted. *Ps. zapotecorum and Ps. mexicana* are worthy candidates for experimentation.

This method negates the need to fruit mushrooms, which can be costly, time-consuming and generally unfavorable to those without sufficient motivation or patience, particularly in the case of the lesser-known and temperamental psilocybin mushrooms such as *Ps. caerulescens*. The process is considerably simpler, less time consuming, and more discrete than fruiting mushrooms. It requires minimal equipment or expensive tools, and results in very high-quality material with little waste or environmental impact. Production requires little space, is easily scaled to suit the specific needs of the cultivator, and the quantity of inoculated material does not change the incubation time required for maximum potency. There is no need for a fruiting apparatus or incubator, and a flow-hood or glove-box is not required when a sterile liquid culture syringe is employed skillfully using filter lids fitted with self-healing injection ports. The creation of these lids requires a moderate level of patience and competency, but with tools readily obtained online or from a typical hardware store, dozens of durable, reusable lids may be created in a single afternoon. The lids are fastened on regular-mouthed or wide-mouthed glass canning jars, which serve as the final incubation vessels. Wide-mouthed jars are preferred for performing grain-to-grain inoculations. Once the grain has been inoculated, there is no need for further maintenance such as misting and fanning, so the grain jars or bags may be left unattended for extended periods of time without risk of failure.

The substrate (hydrated grain) must be sterilized to ensure that competitor fungi and bacteria are eliminated before inoculating with the desired fungi. A pressure-cooker/ canner capable of reaching temperatures necessary for rapid full sterilization will greatly ease the process and virtually eliminate the possibility of contamination when pure starting media is used, and when aseptic technique is followed correctly. However, sterilization by means of a pressure-canner is not required.

Alternatively, a somewhat more tedious but sufficiently effective process called "fractional sterilization" or "Tyndallization" may be employed. This involves the staged immersion of jars in boiling water/steam in intervals over the course of three days. All that is required for this sterilization technique is a large pot with a well-fitting lid.

Pure starting media is of critical importance for this method, as any contamination present in the master inoculant will be transmitted to the media that will ultimately be consumed. Fortunately, it is relatively easy to detect contamination on grain-spawn. Foul-smelling jars, or grain with visible signs of mold or bacteria should be discarded. Only grain with visibly healthy white mycelium and a typically "mushroomy" smell should be used, and only in the complete absence of doubt.

The three most common starting media are spore-prints (mushroom spores stored in a tin-foil envelope), liquid culture (mycelium suspended in liquid nutrient media stored in a sterile syringe), and agar culture (mycelium grown on seaweed gelatin and stored in a petri dish, sterile test-tube or plastic baggie). Liquid culture syringes are preferred for this TEK as they can be expanded without the need for a sterile environment (such as a flow-hood or glove-box). Filter lids with self-healing injection-ports permit the application of liquid culture in open air. Spores on the other hand must be transferred and "cleaned" on sterile agar media, which can only be performed in a sterile environment. Likewise, agar cultures can only be expanded (to agar or liquid culture) in sterile conditions. In this tutorial, various modes of preparing nutrient media will be described in detail.

It is warranted that at least a glove-box be created or obtained in order to permit the long-term storage and preservation of these rare and valuable species of fungi. Due to the legality and discrete nature of spore-prints, they will undoubtedly be the most common and sustainable mode of transferring the genetics through the mail (though a method for sending agar culture via standard lettermail will be described at the end of this manual). In order to sustain the demand for these rare fungi species, it will be necessary to fruit the mushrooms and obtain spore prints, therefore learning to cultivate the mushrooms themselves is strongly encouraged by the writers of this TEK. *Ps. hoogshagenii/semperviva* is quite simple to cultivate, and provides mushrooms of unparalleled quality.

Some useful links with information regarding the cultivation of *Ps. hoogshagenii/ semperviva* are included on the last page of this manual.

Part One: Creating Filter-Lids

The creation of filter-lids with self-healing silicone injection ports is essential for this TEK. Mycelium requires oxygen to survive, so both filters and injection ports are required for liquid culture and grain spawn lids. For liquid culture lids, it is recommended that 13mm (0.22um pore) syringe filters be used for gas exchange, as they allow gas but not liquid to pass through the filter membrane. This allows the jars to be shaken in order to distribute the mycelium and prevent it from forming clumps that will block a syringe needle.

Micron filters (or synthetic filter discs) are preferred for grain-spawn lids, and can be easily obtained online in bulk and cut to size. Compressed/stiffened felt ("EZ-Felt") or Tyvek may also be used as grain-spawn filter material. Alternatively, polyester pillow stuffing (available at craft stores, sometimes called “Polyfil”) may be tightly bunched and stuffed into a hole in a grain-spawn lid, though this is not as effective as a proper micron filter, and should never be used for liquid culture. Plastic “Ball” or “Bernardin” lids are ideal for grain-spawn due to their durability, though standard metal canning lids with bands are suitable. Standard metal lids with bands are recommended for liquid culture, as plastic lids do not form an adequate seal to prevent liquid escaping.

Liquid Culture Lid Tutorial:

- Choose a new metal canning jar lid. Place the lid on a block of wood and drill two holes using a high-speed drill and a sharp 1/4 inch metal drill bit. You may choose to make a small indent with a punch to pilot the hole first. Be very careful and start slowly, as the drill bit may get stuck, causing the lid to spin off and cut your hands.

- Use a rosebud or a sharp utility knife to remove any burrs.



- Both high-temperature RTV gasket-maker silicone and all-purpose 100% silicone will be used. These are easily obtained at hardware stores in a variety of sizes. The RTV silicone is used to make self-healing injection ports, and the all-purpose silicone is used to adhere the filters. RTV silicone may be used for both purposes, but 100% silicone seems to adhere to the lids more readily, making it ideal for fastening the filters.



- Wipe the lid with 70% isopropyl alcohol to ensure good adhesion of the silicone.

- Once the alcohol has evaporated, place a blob of RTV silicone over one of the holes.



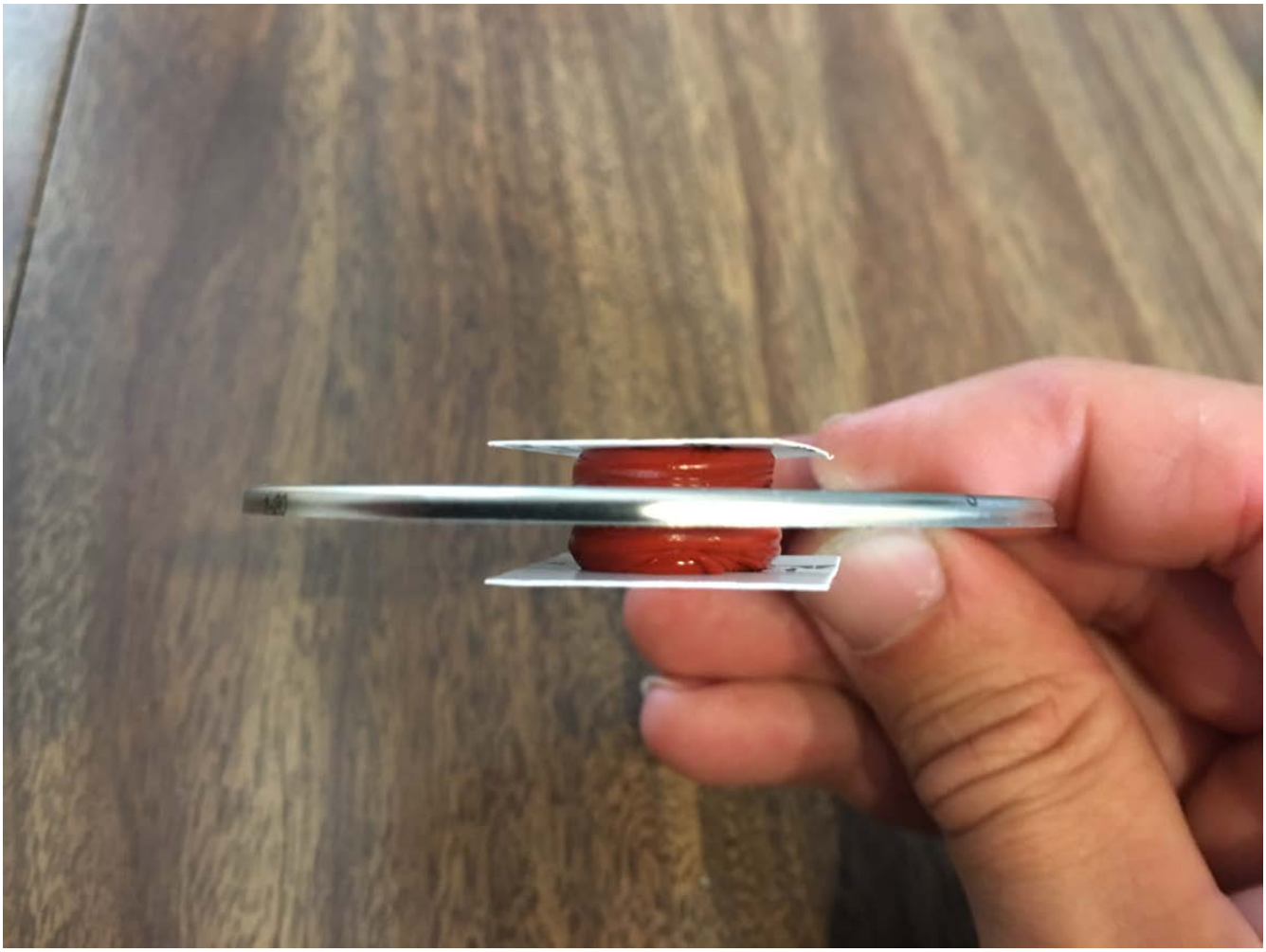
- Using a small square of glossy card paper, press the blob down to create a tidy round button about 1/8th inch thick.



- Flip the lid over and place another blob of silicone on the opposite side of the hole.



- Place another square of card paper on the new blob, depressing to about 1/8th inch thickness. If the blobs are lined up correctly the result should look something like this:



- Now it's time to add the syringe-filter. These 13mm (0.22um pore) filters may be purchased in bulk online. Place a healthy bead of all-purpose 100% silicone all around the underside---not the threaded luer-lock end---of the filter. Be generous, but try not to block the hole.



- Place the narrow tip of the filter into the second hole in the lid and depress it so that the silicone bulges all around the perimeter of the plastic.



- Now place a bead of silicone all around the top of the filter, taking care not to block the hole.

- Work the silicone around with your finger so that it makes contact with the bead at the bottom and creates a kind of sealed “dome” all the way around. This will secure the filter in place and prevent it from peeling off.



- Place a small dab of silicone on the underside of the lid where the narrow tip of the filter pokes out and work it around the tip. This will hold the whole thing in place. Again, try not to get any silicone in the hole.



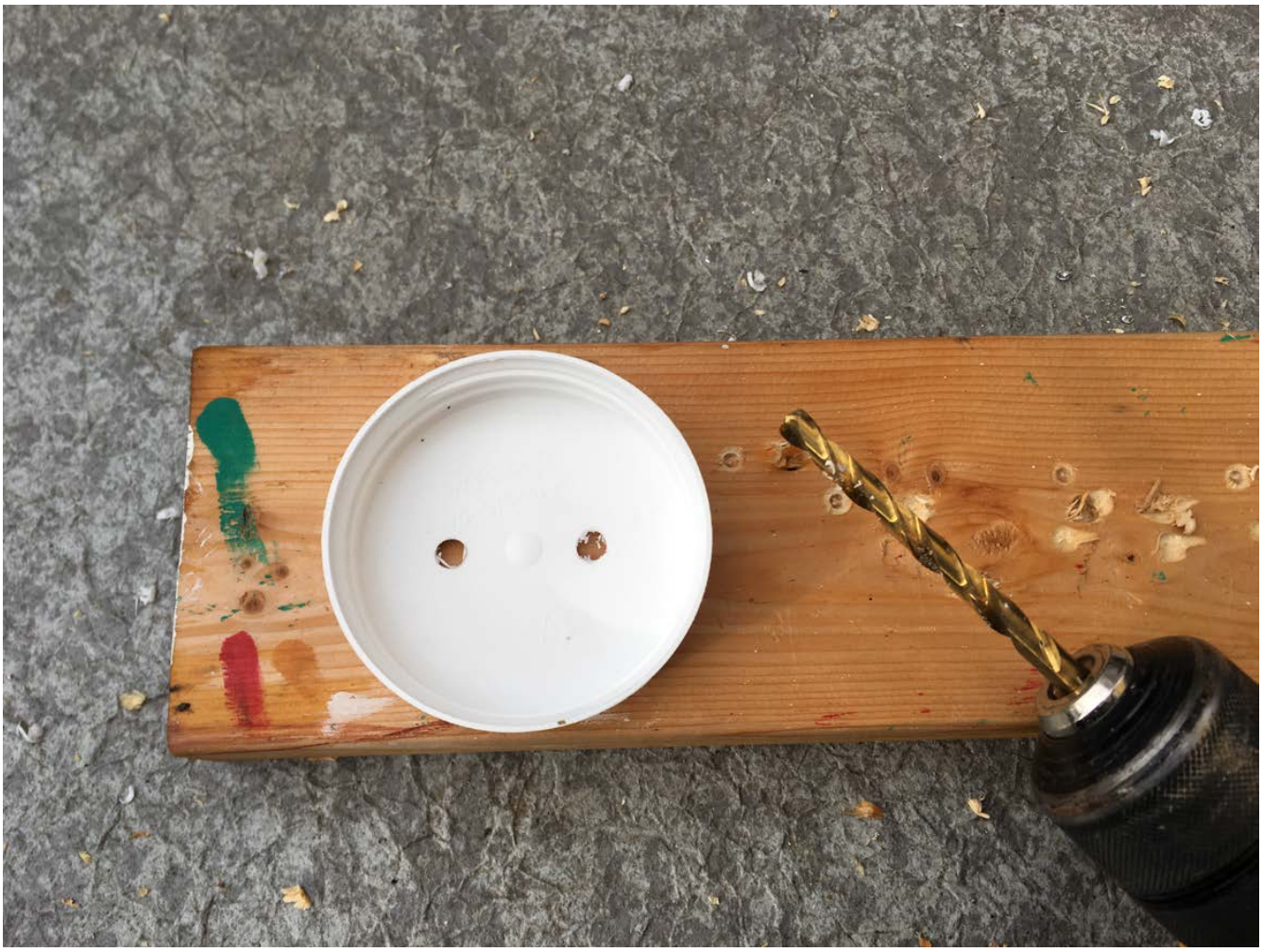
- Allow the lid to cure for no less than 24 hours before removing the card paper. Remove the paper slowly and carefully, as it may damage the injection port if it sticks and pulls. The lid is now ready for sterilization.



Grain-Spawn Lid Tutorial:

- Using a plastic canning lid (wide or standard mouthed, “Ball” or “Bernardin” brand) or a regular metal canning lid, drill two 1/4 inch holes using a high-speed drill, preferably using a pilot-point drill bit. Start slowly and use minimal force; the drill can easily destroy the lid.

- Remove any excess plastic with a rosebud or sharp utility knife.



- Using a sanding sponge or fine-grit sandpaper, lightly sand the top of the lid (not necessary for metal lids), particularly around the holes.

- Wipe the lid with 70% isopropyl alcohol. This will ensure the proper adhesion of the silicone.



- Following the same technique employed for the metal liquid culture lid, place a dollop of high-temperature RTV silicone over one of the holes.



- Using a small square of glossy card paper, press the blob down to create a tidy round button about 1/8th inch thick.



- Repeat the process on the bottom of the lid, on the opposite side of the hole.





- On the top of the lid place a ring of all-purpose 100% silicone around the hole, spaced about 1/4 inch away from the hole.



- Using a small synthetic micron filter disc (or a cut section from a larger disc, Tyvek, or compressed felt), press down gently over the ring of silicone we just created.

- Flip the lid over and watch to make sure the silicone doesn't ooze out the hole and block the filter. Stop pressing the filter down once you see silicone appear around the edge of the hole.





- Wait no less than 24 hours before carefully removing the card paper. Remove the paper slowly and carefully, as it may damage the injection port if it sticks and pulls. The lid is now ready for sterilization.



Part 2: Grain Prep

Many species of grain can be used for this TEK, and each may be more or less useful for specific applications. Brown rice, whole grain oats (with or without husk) and whole barley have been found to be particularly effective, but many others such as wheat, rye and whole millet work fine. Some important points to consider when choosing a grain include price, ease of preparation, environmental impact, and nutrient content. Lighter grains such as millet or brown rice tend to be easier to digest, whereas large-kernel whole grains are more suitable for making tea.

The environmental impact of oat cultivation is comparatively lower than most common grain crops. They are gluten-free, and inexpensive in bulk quantities. They are particularly high in the tryptamine precursor tryptophan and also contain phosphorus (part of the psilocybin molecule) so they may result in a more potent final product. Whole oats without the husk (sometimes called oat "groats") are best used to create flour, as the grains tend to rapidly absorb moisture and become sticky. Whole kernels (with the husk intact) are better for creating tea, as they tend not to disintegrate as quickly as oat "groats".

In a study performed by Dr. Jochen Gartz in the 1980's, it was found that brown rice supported the production of psilocybin at an unprecedented potency when used as a substrate for growing *Psilocybe cubensis*.* Brown rice is reasonably inexpensive, gluten free, readily available nearly everywhere in the world, and quite easy to prepare, so it is also a prime candidate for this process. However, rice also tends to become starchy rather rapidly when boiled in water, so it is best used to create flour which can then be mixed into beverages/smoothies. Personal experimentation may yield different results, so it is recommended to try brewing tea with rice as well. In this TEK, we will focus on both whole oats (with and without husk) and brown rice.

Quart-sized canning jars are used for all of the grain preparation tutorials. Other sizes may be used, but bear in mind that the water/grain ratios described in the "no-boil" tutorials are for quart jars only.

Tap water should not be used to hydrate grain, as it commonly contains fungicides and germicides such as chlorine and chloramine, which will inhibit the growth of your fungi. Filtered water, reverse osmosis water, spring water, well water, or distilled water is recommended.

*https://erowid.org/plants/mushrooms/mushrooms_article10.shtml

How to Hydrate Brown Rice

Simmer/Strain Method
(Works for any size jar, fractional sterilization OK)

- Measure 1 cup of whole dry brown rice per quart jar you intend to inoculate (any size jar is fine, just remember that 1 cup dry = approximately 2 cups hydrated volume). A 1/2-pint canning jar is a useful measure for this step (1/2-pint = 1 US cup = 250ml).



- In a large pot, boil approximately 3 times the volume of clean water (no tap water) as your dry brown rice (i.e. 1 cup rice to 3 cups water).

- When the water has boiled, add the rice and gently simmer for 10 minutes, stirring often.

- After 10 minutes has passed, pour the rice into a large mesh strainer and allow to drain for about half an hour, stirring occasionally.



- Once the rice has drained, distribute it equally into quart jars. If you used 3 cups dried rice, you will fill 3 quart jars equally. Jars are filled only halfway so that the spawn can be broken up more easily after incubation.

- Cover the jars with grain-spawn lids and pressure sterilize for 90 minutes at 15PSI, or fractional sterilize. Jars must be shaken immediately after pressure sterilization to prevent the grains from clumping together. Sterilization will be discussed in Part 3.



How to Hydrate Whole Oats (With Husk)

Whole oats with the husk intact are typically sold as animal feed, and can be obtained from feed/farming supply stores or online in bulk. Grains for animal feed are generally free of pesticides, but they may contain insects, grit and other detritus and should thus be rinsed before using.

No Soak/No Simmer Method
(For quart jars only, pressure sterilization only)

- Measure 1 cup of dried whole oats per quart jar you intend to inoculate. A 1/2-pint canning jar is a useful measure for this step (1/2-pint = 1 US cup = 250ml).



- Rinse well in a mesh strainer and allow to drain for about half an hour, stirring occasionally. Rinsing with tap water is fine.



- Distribute the rinsed and drained grains equally into quart jars. If you used 3 cups dried oats, fill 3 quart jars equally. Jars are filled only partially so that the spawn can be broken up more easily after incubation.

- Add 120ml of clean water to each jar (no tap water), cover with grain-spawn lids and pressure sterilize for 90 minutes at 15PSI. Jars must be shaken immediately after pressure sterilization to prevent the grains from clumping together. Sterilization will be discussed in Part 3.



Soak/Strain Method
(Works for any size jar, fractional sterilization OK)

- Measure 1 cup of dry whole oats per quart jar you intend to inoculate (any size jar is fine, just remember that 1 cup dry = approximately 2 cups hydrated volume). A 1/2-pint canning jar is a useful measure for this step (1/2-pint = 1 US cup = 250ml).



- Rinse well in a mesh strainer and allow to drain for about half an hour, stirring occasionally. Rinsing with tap water is fine.



- In a large pot, boil approximately 3 times the volume of water (no tap water) as your dry whole oats (i.e. 1 cup oats to 3 cups water).

- Add the rinsed /drained oats to the pot and bring back to a boil again. As soon as the water boils, remove from heat, cover with well-fitting lid and soak for 45 minutes. Grains should be firm and chewy (al dente), not mushy. If about 10% of the grains have burst, this is a good indication that proper hydration has been achieved.

- After 45 minutes has passed (or once proper hydration has been achieved), pour the oats into a large mesh strainer and allow to drain for about half an hour, stirring occasionally.



- Distribute into preferred autoclavable vessels and pressure sterilize for 90 minutes at 15PSI, or fractional sterilize. Sterilization will be discussed in Part 3.



Note:

- One final method for hydrating whole oats, is to rinse them in tap water, and soak in filtered water overnight (approximately 12 hours).

- Drain the whole oats well in a large strainer, distribute into preferred autoclavable vessels and pressure sterilize for 90 minutes at 15PSI, or fractional sterilize. Sterilization will be discussed in Part 3.

How to Hydrate Oat Groats (No Husk)

Oat groats are often sold in the bulk section of grocery stores. Make sure they are whole kernel oats and not steel cut oats; steel cut oats will turn to mush very quickly in the presence of water.

No Soak/No Simmer Method
(For quart jars only, pressure sterilization only)

- Measure 1 cup of dry oat groats and place directly into a quart jar. A 1/2-pint canning jar is a useful measure for this step (1/2-pint = 1 US cup = 250ml).



- Add 120ml of clean water to each jar (no tap water), cover with grain-spawn lids and pressure sterilize for 90 minutes at 15PSI. Jars must be shaken immediately after pressure sterilization to prevent the grains from clumping together. Sterilization will be discussed in Part 3.



Simmer/Strain Method
(Works for any size jar, fractional sterilization OK)

- Measure 1 cup of dry oat groats per quart jar you intend to inoculate (any size jar is fine, just remember that 1 cup dry = approximately 2 cups hydrated volume). A 1/2-pint canning jar is a useful measure for this step (1/2-pint = 1 US cup = 250ml).



- In a large pot, boil approximately 3 times the volume of water (no tap water) as your dry oats (i.e. 1 cup oats to 3 cups water).

- When the water has boiled, add the oats and gently simmer for 10-15 minutes, stirring often. Grains should be firm and chewy (al dente), not mushy. If about 10% of the grains have burst, this is a good indication that proper hydration has been achieved.

- After 10-15 minutes has passed (or once proper hydration has been achieved), pour the oats into a large mesh strainer and allow to drain for about half an hour, stirring occasionally.



- Distribute into preferred autoclavable vessels and sterilize for 90 minutes at 15PSI, or fractional sterilize. Jars must be shaken immediately after sterilization to prevent the grains from clumping together. Sterilization will be discussed in Part 3.



Part 3: Sterilization

All nutrient substrates (grain-spawn, liquid culture, agar etc) must be sterilized prior to inoculation in order to prevent the growth of competitor bacteria and fungi. Two sterilization methods will be discussed here; the first is pressure sterilization, which requires the use of a pressure-canner capable of reaching 15PSI. The second method, called “fractional sterilization” or “Tyndallization” requires only a large pot with a well-fitting lid.

Pressure sterilization destroys fungal spores and bacterial endospores through prolonged steam heating at high pressure using a pressure-canner/cooker. A sustained temperature of 121C is possible at 15PSI, which will quickly destroy all potential contaminants. Pressure sterilization is quick and convenient, permitting same-day inoculation of substrates, and ensures full sterilization when correct procedure is followed.

Fractional sterilization (or Tyndallization) destroys fungi and bacteria by first encouraging all spores/endospores to germinate, and then destroying them through successive, repeated boiling/steaming at 100C. It does not require the use of a pressure-canner, a large pot with a lid is sufficient.

Pressure Sterilization

A pressure-canner/cooker should be purchased new, unless the buyer is very confident in identifying damage that may compromise its safety. Damaged gaskets, poor seals, pitting, hairline cracks and warping can all cause failure and serious injury. Be very careful when choosing a cooker.

Choose the model that best suits your needs. A cooker should hold at least one quart jar standing upright, but a 7-10 quart capacity cooker is ideal if one would like to sterilize mycobags. Investing in a larger high-quality cooker has the advantage of allowing one to sterlize more growth media or grain in a single session, thus allowing a higher output return on time and energy input. Pressure-canners can be purchased online or locally at hardware stores and department stores. Most consumer-grade canners (T-Fal, Presto), will have a rubber gasket that requires maintenance/replacement and a rocker set to release pressure at 15PSI. Be sure that your canner is capable of reaching 15PSI. All-American canners feature a pressure gauge and a gasket-free metal-to-metal lid design which requires no maintenance beyond applying a light coat of vegetable oil to the mating surfaces periodically.

How to Operate a Pressure-Cooker/Canner

- Inspect the metal surfaces of the pot for cracks, pitting, corrosion and other damage.

- Inspect the vent pipe and/or safety lock pin to make sure they are completely clear and unobstructed.

- If you have a cooker with a rubber gasket and rubber pressure plug, inspect them before each use to check for cracks, warping or excessive wear. If your gasket is dry, you may use a light coating of vegetable oil to lubricate and preserve it.

- If you have a cooker with a metal-to-metal seal, check to make sure the mating surfaces are clean and free of debris before closing the lid. You may use a light coating of cooking oil on the mating surfaces to ensure a good seal and prevent wear.

- Place rack directly on the bottom of your cooker, or elevated on top of wide-mouth pint jars to keep your media out of the water, which will reduce the risk of cracking jars.

- Make sure there is at least about 1 inch of water in the bottom of the pot.

- Load cooker with your jars or mycobags. Always cover lids with tin-foil to prevent condensation from dripping onto your filters. If sterilizing substrate or casing soil in jars, NEVER tighten lids fully or they may explode. Leave the lids loose and tighten as soon as pressure reaches zero, in order to create a good vacuum seal.

- If your cooker has a rocker weight, make sure to remove it before turning on the stove element.

- After loading the pot, seal the lid and set your element to the highest temperature setting.

- After a few minutes, you will begin to see sputtering and eventually a jet of steam coming from the vent pipe. This is good.

- Once you see a consistent jet of steam blowing out of the pipe, set the rocker weight in place. Most rocker weights are designed to keep the pressure steady at 15PSI. Pressure-specific regulator weights (standard on All-American canners) will not rock, but will release steam sporadically when the specified pressure is reached. If your cooker has a pressure gauge, it should read within 2lbs of 15PSI when the rocker is wobbling, or when the regulator weight opens.

- As pressure builds, the rocker weight will begin to spin or wobble back and forth and release steam. Adjust the heat so that the rocker wobbles slow and steady without stopping (or about one release per minute in the case of pressure-specific regulator weights). This will take some experimentation, but once you find the sweet spot you can record it and remember for next time. You may need to make small adjustments throughout the cycle as the internal temperature of the contents rises.

- NEVER allow the cooker to run out of water. If you smell burning, or if the rocker stops and steam is not coming out of the pipe, remove pot from heat IMMEDIATELY or you may destroy your cooker and even cause a fire. One inch of water will allow for about 2 hours of cook time, so plan accordingly.

- Sterilization requires temperatures in excess of 121C. This temperature must be sustained long enough for heat to penetrate to the center of your jars/mycobags, which is why you must maintain temperature for extended periods of time. Canning jars should be sterilized for 90 minutes, and 5lb mycobags for 2 hours.

- Once the required sterilization time has passed, switch off the hob or burner and allow the pressure to slowly return to zero, or wait for the safety lock pin to drop.

- Once the pressure has dropped to zero, you may open the lid. Be careful to avoid burning your hands, arms or face with the emerging steam (it's usually nothing to worry about).

- Wear oven mitts or leather gloves and tighten jar lids (just snug, do not overtighten).

- Shake or gently tap the jars to break up any clumps of grain.

- Place jars on cooling rack.

- If you aren't planning to do another sterilization cycle, carefully pour out the contents of your cooker and allow it to air dry, or dry it with a dish towel. It will dry more quickly if the water is drained while the cooker is still hot. Never leave water in your cooker for extended durations, or it will corrode and compromise the integrity of the metal.

- Inoculate once jars have cooled completely. Inoculation and incubation will be discussed in part 4.

Fractional Sterilization (“Tyndallization”)

Fractional sterilization requires the use of a large pot with a well-fitting lid, and a wire rack to suspend substrate vessels above the bottom of the pot. The pot must be deep enough that the lid does not contact the jars.

- Place wire rack in the bottom of the pot. Fill the pot with about an inch of water.

- Place substrate vessels on the wire rack. Cover any jar lids with tin-foil to prevent condensation from dripping onto your filters. Place the lid on the pot.



- Bring the water to a boil. Reduce to a rolling boil and set a timer for 30 minutes.

- Remove from heat and allow vessels to cool. Incubate for 24 hours in the warmest part of the house (70-75F is ideal). Do not incubate longer than 30 hours, or new spores may be generated and you will have to begin the process over again.

- Boil jars again for 30 minutes, and again incubate at room temperature for 24 hours.

- For the last boiling period, boil for 1 full hour. Inoculate jars/vessels once they have cooled completely. Inoculation and incubation will be discussed in part 4.



Part 4: Inoculation/Incubation

The benefit of using self-healing injection-port lids is that they allow for sterile inoculations of both liquid culture and grain-spawn without the use of a flow-hood or glove-box. Injection-ports are simply wiped with 70% isopropyl alcohol and injected with a sterile liquid culture syringe needle. 10ml luer-lock syringes with 18 gauge needles work well, and they can be sterilized and reused over and over again (instructions on how to sterilize syringes/needles can be found at the end of this manual).

In order to preserve a liquid culture for future use, it is recommended that a new liquid culture jar be created in order to expand from a liquid culture syringe. This will permit dozens of future inoculations, and the creation of new liquid culture syringes. When your jar is nearing empty, simply create a new one and transfer a few drops of the old liquid culture into the newly prepared jar.

Starting from a spore-print will be sometimes be necessary, which will require the use of a glove-box or flowhood. An internet search will turn up many different glove-box tutorials. Choose one that works best for you and you will be able to start your own cultures from spores, and take your own spore-prints to send through the mail.

Inoculating Agar with a Spore-Print

Spore-prints are never sterile because mushrooms are grown in non-sterile conditions. Therefore it is necessary to inoculate sterilized agar media to germinate spores and acquire a clean sample. This is done by placing a spore sample onto the surface of agar, growing it out and selecting a section of uncontaminated mycelium to transfer to new sterile agar media.

You will need:

- A spore-print

- A scalpel or inoculation loop (any pointed metal object will do)

- A lighter/alcohol lamp

- 70% isopropyl alcohol

- Sterile agar media (shallow canning jar with grain-spawn lid or sterile petri dish)



Procedure

- Disinfect your workspace (glove-box or flow-hood work area) with 70% isopropyl alcohol.

- Disinfect your hands and arms. Wearing a surgical mask is a good idea.

- Disinfect all tools and your agar vessel before bringing them into the workspace.

- Flame-sterilize your scalpel or inoculation tool until the tip glows red. Allow it to cool for 15-20 seconds.

- Carefully open your spore-print.

- Using the blunt side of your scalpel, dab the tip onto a dark area of the print. If you don't see spores on your scalpel, that's fine, you only need a very tiny sample.



- Open your agar vessel and dab the tip into the jar. You may choose to inoculate two or three points on the agar surface to maximize the potential of achieving a viable culture.

- Close the vessel, label with the species and date, and incubate between 70-80F.



Isolating a Clean Sample From Spore-Agar

Because spore-prints are never fully sterile, it is likely that bacteria and other fungi may grow alongside the desired fungi. It is thus necessary to isolate an uncontaminated section of mycelium and separate it from the contaminated region. The clean sector is then transferred to a fresh sterile agar dish and grown out. Further transfers may be necessary to achieve a clean culture.

Procedure

- Disinfect your workspace (glove-box or flow-hood work area) with 70% isopropyl alcohol.

- Disinfect your hands and arms. Wearing a surgical mask is a good idea.

- Disinfect all tools and your agar vessels before bringing them into the workspace.

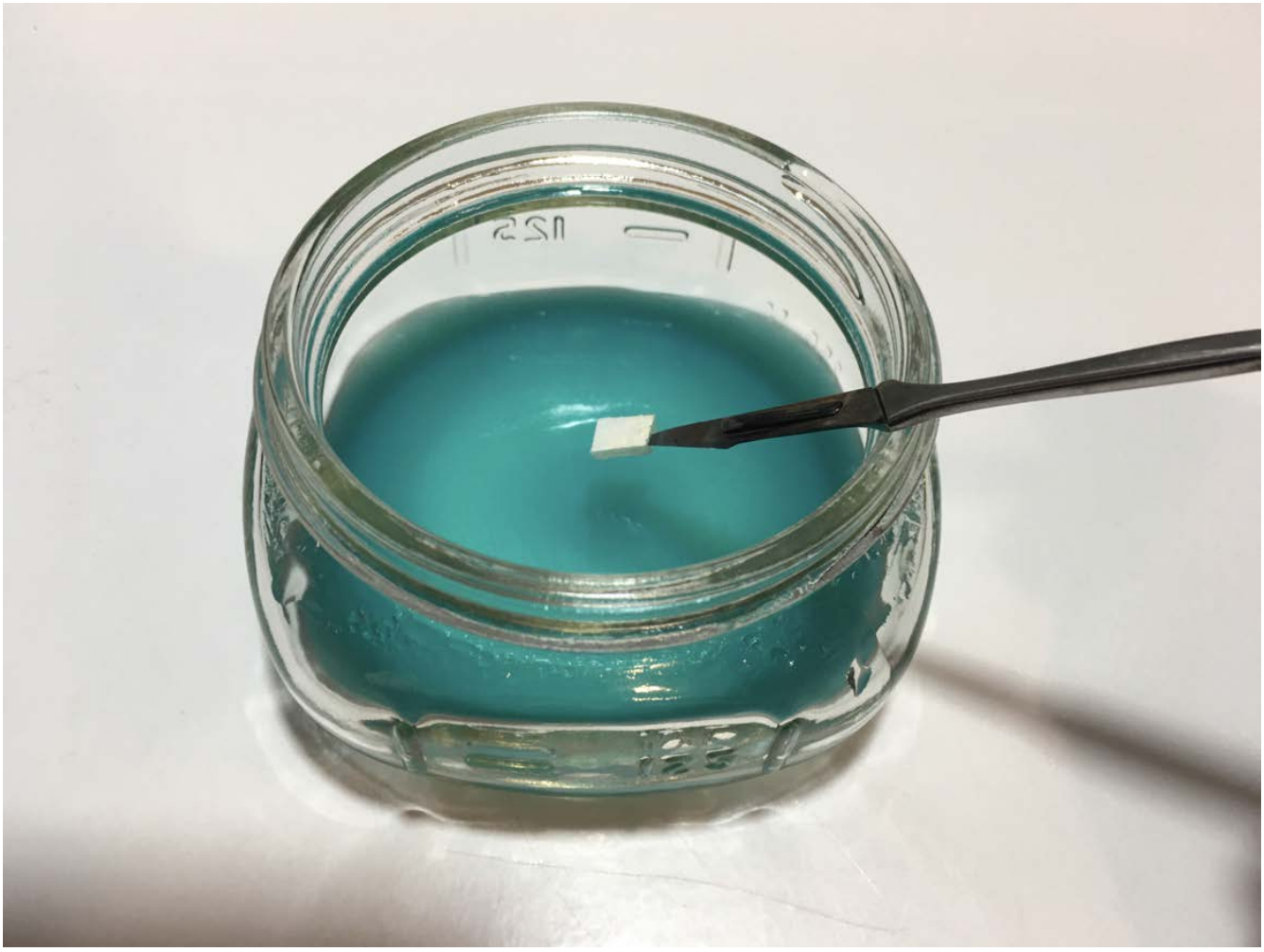
- Flame-sterilize your scalpel or inoculation tool until the tip glows red. No need to wait for it to cool, as it will cool immediately upon contact with the agar.

- Open the previously inoculated agar vessel, and select a region of mycelium that looks very white and fluffy, with no signs of contamination (discoloration, sliminess, or mold spores). Selecting a very small piece from the outer leading edge will increase the likelihood of a clean transfer. Work quickly to reduce potential exposure to contaminants.



- Open your fresh agar vessel and place the agar wedge in the center, cutting into the agar surface if necessary. Work quickly to reduce potential exposure to contaminants.

- Close the vessel, label with the species/date, and incubate between 70-80F.



Inoculating Liquid Culture with Agar

- Disinfect your workspace (glove-box or flow-hood work area) with 70% isopropyl alcohol.

- Disinfect your hands and arms. Wearing a surgical mask is a good idea.

- Disinfect all tools, your agar vessel and liquid culture jar before bringing them into the workspace.

- Flame-sterilize your scalpel or inoculation tool until the tip glows red. No need to wait for it to cool, as it will cool immediately upon contact with the agar.

- Select a clean, pure white region of mycelium from the outer leading edge. You may choose to make several cuts and transfer a few wedges to increase the speed of colonization.



- Working very quickly, open your liquid culture lid and tap the scalpel on the rim of the jar to knock the wedge into the liquid.

- Close the lid immediately. Label with the species/date and incubate between 70-80F.







Inoculating Liquid Culture with a Liquid Culture Syringe

- Work indoors and close windows, doors etc. to minimize airflow and airborne contaminants. Wearing a surgical mask is a good idea.

- Disinfect hands and arms well with lots of 70% isopropyl alcohol (repeat throughout process as necessary).

- Disinfect work area by wiping surfaces with alcohol.

- Disinfect the entire surface of your master LC jar, and your freshly sterilized LC jar, taking extra care to wipe the injection ports.

- If you plan to fill a syringe for later use, disinfect a luer-lock syringe cap by fully saturating with alcohol, or by placing it in a small dish of alcohol until you're ready to use it.

- Wipe syringe and needle with alcohol. Wait for alcohol to evaporate completely, then flame the needle tip until it glows red (used needle only, no need to flame sterilize a newly unpackaged needle).

- Wait 10-15 seconds for needle to cool, or dip the tip in a small dish of alcohol.

- Wipe the injection port on your master LC jar, give it a swirl to distribute the mycelium and quickly insert the needle.

- Tilt the LC jar and begin to draw out liquid into the syringe. If it gets plugged, just squirt a little bit of liquid back into the jar to clear the clog.

- Once the syringe is full, quickly remove it and wipe the injection port.

- Wipe the injection port on your fresh LC jar and quickly insert the needle of your newly loaded syringe. Deposit a few drops of liquid and remove the needle. Wipe the injection port again.

- Cap the needle immediately. If you plan to store the syringe now, consider removing the used needle tip and capping the syringe with a luer-lock syringe cap that has been sterilized or soaked in alcohol. Used syringes and needles may be sterilized and reused over and over again.

- Label and store the syringe in a zip bag in the refrigerator. It will keep for two years or more if stored this way.





Incubating Liquid Culture

- Incubate your LC between 70-80F. Room temperature is fine.

- Swirl/shake at least every two days.

- When there is a large jelly-like blob of mycelium filling about 60% of the liquid (approx. 1-2 weeks), store it in the refrigerator. Be sure to shake/swirl it occasionally. It may be stored this way for up to two years, and may be used over and over again.



Inoculating Grain Spawn

- Work indoors and close windows, doors etc. to minimize airflow and airborne contaminants. Wearing a surgical mask is a good idea.

- Disinfect hands and arms well with lots of 70% isopropyl alcohol (repeat throughout process as necessary).

- Disinfect work area by wiping surfaces with alcohol.

- Disinfect the entire surface of your grain spawn jar, taking extra care to wipe the injection port.

- Disinfect your LC syringe or multispore syringe, and the packaging of a new needle if you will be using one.

- Wipe syringe and needle with alcohol. Wait for alcohol to evaporate completely, then flame the needle tip until it glows red (used needle only, no need to flame sterilize a newly unpackaged needle).

- Wait 10-15 seconds for needle to cool, or dip the tip in a small dish of alcohol.

- Wipe the injection port on your grain spawn jar with alcohol and fully insert your needle.

- Aiming the needle at the sides of the jar, shoot about 0.5 to 1ml/cc of liquid at each of the four quarters of the jar (2-4ml per jar).

- After removing the needle, always wipe the injection port to remove any residue that might attract contaminants.

- Quickly re-cap your needle or remove the needle and replace with a luer-lock syringe cap that has been sterilized or soaked in alcohol.

- Label and store the syringe in a zip bag in the refrigerator. It will keep for two years or more if stored this way.





Incubating Grain Spawn

- Incubate your grain spawn between 70-80F. Room temperature is fine.

- If inoculated with liquid culture, wait until you see streaks of mycelium covering about 15-20% of the visible grains next to the glass, then shake the jar very well to evenly distribute the inoculated grains throughout the jar. This should take about 4-6 days.

- You may also choose to shake the jar immediately after inoculating with liquid culture, do what works best for you.



- Once the jar is totally permeated with white mycelium (usually after about two weeks), you may use the jar to inoculate a 5lb mycobag or continue to incubate for two months before dehydrating and consuming it. Longer incubation time may further increase potency, but this has yet to be tested.



Part 5: Preservation and Storage

The most difficult work is done, and the waiting is over. Now it's time to ensure that your hard work doesn't go to waste. The best way to preserve the fruits of your labor is to dehydrate the grains completely and store them in a glass jar with a desiccant pack. Storing the grain this way will preserve its potency for a very long time, potentially for years. A dehydrator with fruit-leather trays is ideal for this process. Alternatively, you may wish to divide the colonized grains into individual portions and freeze them, keeping in mind that 1 level tablespoon equals roughly 1 gram *Ps. cubensis*.

Dehydrating the Grains

- Break up the spawn by bluntly tapping the bottom of the jar on the padded armrest of a couch, or on a rubber tire. Avoid hitting the middle of the jar where the glass is weakest. Don't hit it too hard, it will be quite easy to break up.



- Shake the jar well to break all the clumps apart. Dump the grains onto fruit-leather trays and distribute evenly. Two standard round trays will hold 500ml (half a quart jar) of colonized grains.



- If your dehydrator has a temperature setting, set it to 40-50C and dehydrate for 24 hours. Stack trays as needed. The writers of this TEK have noticed no loss in potency when dehydrating with added heat.

- After 24 hours has passed, chew a kernel of grain to make sure it is completely dry. It should be hard like a rock.

- Dump the dried kernels into a large mixing bowl.

- Using a canning funnel or a piece of card paper folded into a funnel, dump the grains into a clean glass jar (a canning jar with a well-sealing lid works best).







- Place a desiccant pack in the jar with the grain and seal the lid. If you choose to store the jar in the freezer or refrigerator, just make sure to let the jar warm to room temperature before opening it, or condensation will instantly build up inside the jar.

- Desiccant packs may be created by wrapping scentless silica cat litter inside of little paper envelopes, or pouches made from squares of Tyvek filter material. The pack shown in the photo is made from silica cat litter and Tyvek formed into a pouch and sealed with masking tape.



Part 6: Preparing the Grain for Consumption

The preserved grains may now either be brewed in tea or ground into flour and consumed. For softer, smaller grains like brown rice or oat-groats, it is recommended that one grind the grains into flour. Tea is best prepared using larger whole-grains that will not quickly turn to mush when simmering. 1 level tablespoon of dried kernels is roughly equal to 1g of dried Ps. cubensis.

Preparing Flour

- Place kernels of grain into a coffee-grinder and pulverize them into a very fine flour. Add to smoothies or hot chocolate.



Preparing Tea

- Boil as much water as you intend to consume, keeping in mind that 1 level tablespoon of kernels equals roughly 1 gram *Ps. cubensis.* For 4-8 tablespoons, 2 cups of water is perfect.

- Add the grains once the water has boiled. Reduce to a gentle simmer and stir periodically for 20 minutes.



- Once 20 minutes has passed, pour the liquid into a canning jar with a coffee-filter fitted over the mouth. Use the metal ring to hold the filter in place (don't tighten the ring or it may tear the filter). You may also use a small mesh strainer or a French press for this step.







- Allow the grains to drain for a minute or two. There is no need to squeeze the liquid out.

- Compost the grains or bake them into a hearty loaf of bread.

- If you so choose you may place the liquid back in a small pot and use it to brew a tea of your choice. The authors of this TEK prefer to mix it with high-quality cacao. Simply bring the liquid back to a low simmer and add a teabag, a teaball with loose-leaf tea, or a heaping tablespoon of cacao. If you choose to add cacao, use a whisk to stir it well. You may also add milk or cream.

- Keep in mind that tea will bring on the effects much more quickly than consuming mushrooms. It is advised that one drink it slowly over the course of 45 minutes to an hour.




keep warm zone



Part 7 (the most important part):

Enjoy :)



Recipes

Malt/Corn Syrup Liquid Culture

(Fills a pint-jar halfway)

Ingredients

- 250ml distilled or reverse osmosis water.

- 5ml (1 teaspoon) light corn syrup ("Crown" or "Karo" work great, easy to find at grocery stores or online). Honey will work too.

- 0.5 gram dry light malt extract (available at brew supply shops or online. Store in well-sealed jar with a desiccant pack, and never let the powder contact moisture or it will turn into a rock and be rendered useless!)

- You may wish to place a couple of pieces of broken glass or small sharp stones into the jar to make it easier to agitate and break up the mycelium before extracting with a syringe.

Procedure

- Boil water (no tap water).

- Measure corn syrup and dry malt extract and place into 500ml or larger heat-resistant glass vessel.

- Pour water into glass vessel and stir until ingredients have dissolved completely. Try to get all the corn syrup off of the teaspoon by using it to stir the solution.

- Pour contents equally into two half-pint jars or a single pint jar.

- Cover with liquid culture lid and tighten metal ring securely (don't over-tighten).

- Cover lid with foil and pressure sterilize for 20 minutes at 15PSI, or fractional sterilize.

- Wait for the jars to cool completely before inoculating.

Malt Yeast Agar

(Fills eight to twelve shallow glass canning jars or petri dishes)

Ingredients

- 11 grams agar powder (available online)

- 6 grams dry extra light or light malt extract (available at brew supply shops or online)

- 0.5 grams active dry yeast (Fleischmann's bread yeast, available at major grocery stores)

- 500ml distilled or reverse osmosis water.

- 5-10 drops of dark food coloring (optional, helps make mycelium more visible due to high contrast. Blue works very well)

Alternatively, agar may be prepared using the following measurements per jar/dish needed:

- 25ml distilled or reverse osmosis water

- 0.5g agar powder

- 0.5g light malt extract

- Pinch of active dry yeast

Procedure

- Boil water, preferably in a vessel with a pouring spout.

- Turn heat down to very low simmer. Whisk in malt and mix until fully dissolved.

- Add remaining ingredients and whisk constantly until mixture begins to thicken. Turn the heat up a little if necessary, but DO NOT let it boil or it will burn. This may take several minutes, just be patient.

- Once the mixture has thickened to about the consistency of runny gravy, remove from heat and pour into your reusable glass agar canning jars. 1/8” to 1/4” is a good depth/ thickness.

- Cover with micron filter lids, tighten snugly.

- Cover lid with foil and pressure sterilize for 20 minutes at 15PSI, or fractional sterilize.

- Wait for the jars to cool completely before inoculating.

Sterilizing Used Syringes/Needles

Used luer-lock syringes and needles can be sterilized and re-used over and over again.

- Place the syringes (with needles/caps attached) in a wide-mouthed quart-sized canning jar with about a tablespoon of water at the bottom (to prevent dry heat).

- Cover with a grain-spawn lid and tin foil, and sterilize in a pressure cooker/canner for 20 minutes at 15PSI. The syringes will be clean and ready to extract liquid culture whenever you need them.



Sending Agar Samples Via Standard Lettermail

Due to the discreet nature of spore prints, they have become the most common medium for mailing genetics internationally. Sending agar samples in centrifuge tubes is risky because they must be sent via parcel, which requires a customs declaration slip for international shipments. This method details how to send agar wedges aseptically and discreetly in envelopes that meet the size requirements for standard international lettermail. Zip-baggies from the dollar store are sterile from the factory, so they are perfect as an alternative to sterile centrifuge tubes.

You will need:

- A sterile work environment such as a glove-box or flow-hood

- Agar culture

- A scalpel

- A cigarette lighter/alcohol lamp

- Two brand-new unopened zip-baggies, one small and one slightly larger

- 70% isopropyl alcohol

- A Hallmark card with matching envelope

- Scotch tape



Procedure:

- Wipe your hands/arms, the entire work surface and all necessary items with 70% isopropyl alcohol. Take extra care wiping the zip baggies, making sure to wipe inside the flaps above the seal.

- Flame sterilize the scalpel with a lighter or alcohol lamp.

- Open your agar vessel and cut a small wedge. A half-inch square is ideal. The wedge should be no more than 1/8th inch in thickness.*

*At this stage, you may wish to store a wedge of agar in a sterile 2.0ml centrifuge tube (available online) in order to preserve your culture. This is a viable alternative to a spore-print for long term storage. It will keep for up to two years in the fridge, and can simply be expanded in a new agar dish.



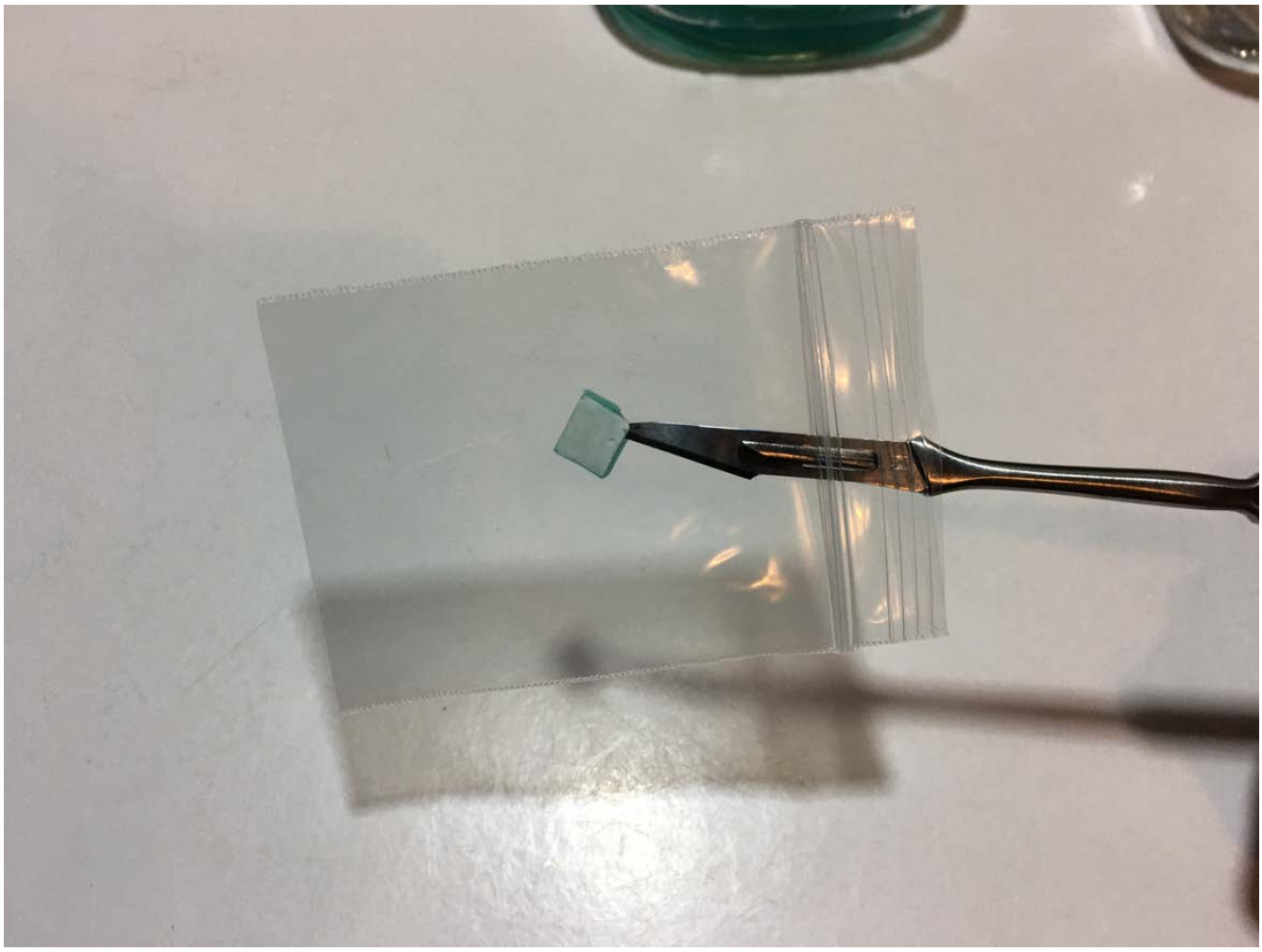
- Place the wedge inside of the smaller zip-baggie and remove the scalpel. Close the baggie.

- Place the small baggie inside of the larger baggie and close it up.

- Using a couple of strips of Scotch tape. Tape the double-baggie to the inside of the Hallmark card.

- Seal the card in the envelope, affix the appropriate postage and give it to your trusty carrier pigeon.

- Give the bird a loving pat, feed it plenty of myceliated birdseed to fuel it up for the long journey, and send it on its way.








FOR A SPECIAL
Mom
FROM YOUR SON

Useful Links

Mycology Related Web Forums:

Mycotopia.net

Shroomology.org

Shroomery.org

Helpful Cultivation Resources:

The Shadowbox: A Low-Maintainence Fruiting Chamber TEK

Psilocybe semperviva - Two Substrates Compared

Miscellaneous:

An in-depth discussion about the Mazatec traditional velada ceremony, including techniques and experiences from seasoned and amateur voyagers.