PF-TEK - Psilocybe Cubensis growing techniques

Psylocybe Fanaticus, et al.

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Abstract

The PF-TEK is basically a brown rice method with an improved formula by using vermiculite as a base and adding pulverised brown rice. The secret is in the vermiculite. When mycelium is cultured in just grain, the mycelium turns into a mass with little air space. But when grown with vermiculite, the mycelial threads stretch across space. The important thing about the PF-TEK, is that it copies nature. Instead of the usual cloning of mushroom tissue and growing mushrooms from that, a mass spore inoculation is employed directly to the fruiting substrate. That way, the genotype remains complete. Senescence (mutating and ceased fruiting) is no longer a problem. The spores insure a never ending succession of fungus, with all the power of the spores reproductive ability intact.

Overview of techniques

1. Brown rice powder, vermiculite and distilled water are mixed and loaded into a $\frac{1}{2}$ pint ($\frac{1}{4}$ L) jar, which is steam sterilized. The jar is then inoculated by the spore syringe.

2. After the substrate cake in the jar colonizes and begins to show signs of fruiting, the cake is released from the jar and placed into the dual chambered terrarium to fruit.

3. A mature mushroom is decapitated and spore printed in a jar.

4. Spore syringes are prepared with the spore print jar to begin another life cycle.

The original guide called "PF-tek" is an invention from Psylocybe Fanaticus (PF), a scientist in growing fungi and spore seller. Due to laws in the USA which prohibited his activities, PF had to face legal consequences and had to quit selling spores and growing guides and he also had to shut down his web site.

This guide is more-or-less the original PF-tek from the PF web site. It only differs from the original one by additional material that can be found in the appendices.

Use this guide for your convenience, but be aware that activities forthcomming from this guide could have been made illegal by your local government.

The PF-TEK has been LaTeXed by *Zauberpilz,* Semilanceata@xs4all.nl

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3. Shoulderless half-pint jars with lids (Kerr or Ball)
4. Organic brown rice flour (organic food stores)
5. Horticultural vermiculite (medium or fine grade - not powdery)
6. Distilled or filtered drinking water
7. Heavy duty tin foil
8. Heavy duty (professional grade) masking tape
9. Ice pick (for punching needle holes in the culture jar lid)

Mushroom growing (Stage two) Pet shop - Hardware store

1. 10 gallon (45 L) aquarium
2. Cut piece of transparent plastic (Plexiglas) - (terrarium chamber partition)
3. Strips of wood with connectors and screws (terrarium lid)
4. Plastic film and thumb tacks (terrarium lid)
5. Small wall type thermometer
6. "All purpose" water spray bottle with an adjustable nozzle (hardware and grocery stores). Procure one that gives a good strong spray for instant humidification. Avoid recycled kitchen product sprayers. This is a critical piece of equipment. Only a good quality sprayer (a couple of dollars at a hardware store) can immediately supercharge the dual chambered terrarium with high humidity.
7. Wire screen - plastic containers - plastic bags - (drying mushrooms)
8. Desiccant for drying mushrooms (scientific - chemical - lab supply)

Spore printing and spore syringe making (Stage three)

1. Micro curved cuticle (finger nail) scissors (cosmetics - drug store)
2. Denatured alcohol (fuel - hardware stores)
3. Tequila shot glass and eye dropper (sterilizing and flaming)
4. Glass stirring rod (Scientific supply)
5. Plastic syringes (10 mL or bigger) and 18 gauge $1\frac{1}{2}$ inch (4 cm) needles. Large sized syringes are good (20 mL - 65 mL) as well as extra long needles if available. (Retail medical - health supply - pharmacies - drug stores - scientific and lab supply)

2 PF substrate formulation

Jars and glasses to be used with this technique are $\frac{1}{2}$ pint capacity (8 ounces) - (250 mL). They must have tapered sides and no shoulders, otherwise the fungus cakes won't easily come out of the jars.

Appropriate jars; (source - super markets and hardware stores)

- KERR wide mouth half pint canning jar - preferable
- BALL wide mouth half pint (similar to the KERR wide mouth half pint) - preferable
- BALL regular mouth half pint canning jar
- BALL half pint jelly jar
- $\frac{1}{2}$ pint (250 mL) capacity drinking glasses (tapered sides)

Note: even though the regular mouth BALL half pint and the regular mouth KERR half pint look similar, the KERR is not tapered.

1. $\frac{1}{8}$ cup of brown rice powder (Health food stores and co-ops)
2. $\frac{1}{2}$ - $\frac{2}{3}$ cup of horticultural vermiculite (medium grade) (garden centers and hardware)
3. 40 - 45 mL (cc) of water (or a little less than $\frac{1}{4}$ cup, or 1 & $\frac{1}{2}$ ounces, or 3 tablespoons + 1 teaspoon)

Maximum fruiting formula:

1. $\frac{1}{4}$ cup of brown rice powder
2. $\frac{1}{2}$ cup of vermiculite
3. 45 - 60 mL water

Note: The water is the crucial element that variates the results. The different brands of vermiculite varies creating differing moisture levels. So as already stated in the PF-TEK, one should always vary the water amount, take notes and compare results. The "MAX" water content can really make a great fruiting and give several flushes when the balance between the substrate elements is good.

Not all vermiculite is the same. The coarseness varies quite considerably among different brands. The coarser type will hold less water than the finer type which will alter the water holding capacity. If the formulation (water content) results in a really wet or sloppy substrate, use less water. Keep notes on formulæ for replicating the substrate formula that fruits the best.

The above formulæ utilize the *finer type* of vermiculite. If the above maximum fruiting formula is used with the finer type of vermiculite, the jar lid should be loose during incubation (see section 3.4 "The canning jar lid (loose or tight)" on page 8). The *finer type* of vermiculite is recommended over the coarser type because it holds more water. To ascertain the size of the vermiculite particles, observe them under a photo magnifier next to a millimeter ruler. The finer type of vermiculite has particles averaging around 1 millimeter across (some larger and some smaller). The coarser type has particles averaging around 4 or 5 millimeters across

and up to 8 millimeters. Stores usually carry one type. Plus, there will be regional differences in the different brands of vermiculite. Shop around and try to get both types to compare.

To make homemade brown rice powder, place some regular brown rice in a small canister type coffee bean grinder and grind it to fine powder. Freshly ground brown rice is recommended over prepackaged type. The freshness sometimes makes a big difference.

If the measuring cup specs aren't true, the formulæ will be off, setting up certain failure or diminished growth. Check the cup measures this way: 1 cup is 237 mL which is $\frac{1}{2}$ pint or 8 liquid ounces (English measurement). There are 2 cups in a pint, 2 pints in a quart and 4 cups in a quart.

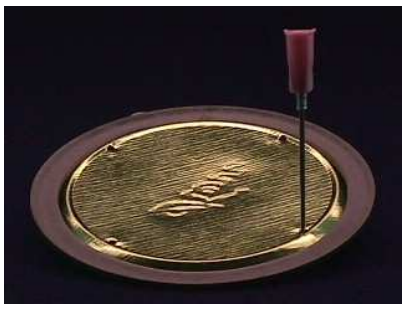

Figure 1: Preparing the canning lid

Prepare the canning lid by placing it with the rubber sealing edge upwards on a supporting surface and with a sharpened 3 penny nail (held with vise grip pliers), punch 4 holes inside the periphery of the rubber sealing edge (see figure 1).

When using two piece canning jar lids, the inner lid (with the rubber edges up) rests on the top of the jar and when the lid band is screwed off, the lid remains resting on the jar top. To make the lid and band act as one lid, place pieces of masking tape on the lid attaching the band to the lid. Then, the lid can be adjusted for air ventilation and looseness like an ordinary one piece jar lid.

2.1 PF substrate jar preparation

Steam sterilizing PF substrate jars with regular cookware is possible because there is no grain to cook up and the substrate is airy. Other regular jars (other than canning type) or small drinking glasses (with tin foil covering) can be substituted for these canning jars. To insure similar results, make sure the jars or glasses are tapered sided with no shoulder of any kind, and that they have a $\frac{1}{2}$ pint (8 ounce - 250 mL) capacity. It is important to note, that jars somewhat larger than $\frac{1}{2}$ pint are unreliable for the PF-TEK and fail easily. The low form KERR $\frac{1}{2}$ pint canning jar is the most versatile (fits into tight spaces et).

A 3 piece vegetable steamer (pot, basket insert & lid) is used for the steam sterilizing stage. Also, the stainless steel vegetable steamers that fold out and stand on the bottom of the pot are good. Anything is good as long as it keeps the jar bottoms off the pot bottom where the high temperature will crack the glass.

Step 1 Place $\frac{1}{2}$ cup of vermiculite into a mixing bowl. Place the brown rice powder on top of the vermiculite. Slowly add the water directly onto the brown rice powder, wetting it first. Thoroughly mix the ingredients. The mixture should feel damp and cohesive. More water (or less) can be used if experimenting to improve the fruiting. Mix Each jars substrate individually for loading to insure accurate formula rendering.

A note on water: A recent update is worth mentioning. Water quality is indeed important. I have found out that "natural" water is the water to use. It makes for better cultivation of this mushroom on this simple substrate. Distilled water is good for making spore solutions and syringes and storing spore solution. But for growing, they seem to like the "natural" water such as: swamp, lake, stream, pond,river, ground or any water that is rich in organics. I have heard that "mineral" type drinking water is good and makes a difference. I suppose that water seeping from an organic compost pile would be about the best.

Step 2 Fill the jar very loosely. Leave a $\frac{1}{2}$ to $\frac{3}{4}$ inch space at the top. Level the substrate. With a tissue or a fingertip, wipe the insides of the jar down to the substrate. Fill the top of the jar with plain dry vermiculite and level it off at the top. This upper layer will protect the wet substrate from air borne contaminants. It acts as a contaminant barrier. This is a Psylocybe Fanaticus original discovery. What this dry vermiculite layer does is protect the wet substrate from airborne contaminants and also absorbs and regulates moisture transpiration and condensation.

Figure 2: How to fill the jar

In figure 2, the black tape is the depth for the dry vermiculite. The masking tape shows where the PF substrate goes. The top layer of dry vermiculite must be between $\frac{1}{2}$" to $\frac{2}{3}$" deep to provide protection from contaminants entering from above.

Tamping down tek Getting the substrate level correct is very important. A slight tamping down is required. To get an accurate leveling of the substrate, loosely load the $\frac{1}{2}$ pint jar and level the top of the mixture with the top of the jar. Screw a cap on the top to hold the mixture in. With one hand, hold the jar and lightly slam the bottom of the jar on the other palm a couple of times to lower the mixture level to around $\frac{1}{2}$" - $\frac{2}{3}$" from the top rim. Further level and

adjust the substrate with a fork down to the proper height. Clean the inside of the jar down to the substrate level with your finger tip or a paper towel and fill the jar back to the top with dry vermiculite.

Step 3 Place the lid on the jar with the rubberized edge up (jagged edges of the needle holes down). Screw the lid band on. Place pieces of "professional" grade masking tape (holds on during steaming) over the needle holes. This is to protect the needle holes from contaminant entry.

Step 4 Heat the pot of water to a boil. Put the jars into the pot with the lid bands loose so that the steam can penetrate the jars quickly. The jars can sit in water but make sure boiling water can't slosh into the jars. Turn the heat down and *gently* steam the jars at the lowest possible boil for an hour in a *tightly* covered pot (gas stoves are the easiest to control). A good tight fitting pot lid is essential for successful steaming.

When steaming or pressure canning is performed, the jars must be protected from water dripping down from the underside of the pot lid caused by heavy condensation and drip off during boiling. This water can get into the jars by entering under the jar lids that aren't tight and soaking the substrate - throwing off the formula and setting up failure. To prevent this, wrap some tin foil around the cap to ward off the water. The tin foil can be removed after steaming (with the tape guarding the needle holes - or the tin foil can be left on until it is inoculation time.)

Be careful to not overheat the jars, this dries the substrate. Drying is evidenced by o.k. spore germination and halted growth. The fungus will spread but stop at a certain point depending on how dry the substrate has become. Generally, any halted growth (with no contamination) is a sign of dried substrate. This is an important concept that will enable diagnosis and correction of problems experienced with drying. The remedy is to increase the water content of the substrate formula in use. After the jars have cooled, tighten the lids and store them in a cool draft free place until ready to inoculate them.

2.2 Pressure canner use

PF jars and water bottles can be quickly sterilized with a pressure canner. For proper and safe use of the pressure canner, always refer to the manual that comes with it. If the canner is used and has no manual, try to get one from the manufacturer before using it. Pressure canners can be dangerous if used incorrectly.

Sterilization times

- $\frac{1}{2}$ pint PF substrate jars - 12 p.s.i. for 20 minutes
- Water bottles - 12 p.s.i. for 55 minutes
- Syringes and needles - 12 p.s.i. for 10 minutes

3 Inoculation of the PF substrate jars

Figure 3: The inoculation

Any jar to be inoculated must be cool to the touch before proceeding. Make sure the lid is tight. Shake the syringe well and remove the tape from the syringe needle guard. This shaking of the syringe is important as to redistribute the spores in the water. Take off the tape covering the needle holes. Remove the needle guard and insert the needle through the lid hole (see figure 3). Tilt the syringe body back towards the center of the lid with the needle tip touching the glass. This distributes the spore water down the side of the jar, giving a good inoculation down the side of the substrate cake. Inoculate a few drops down each needle hole. As the syringe plunger is pressed, observe the needle tip against the inside of the glass. As soon as water appears around the needle tip, release the syringe plunger pressure. In between each hole inoculation, shake the syringe a little to keep the spores distributed.

Use 1mL per jar. This will allow the syringe to inoculate 10 jars. More spore solution per jar can be used (speeds colonization), but fewer jars can be inoculated. If the syringe needle plugs up as it is inserted into the substrate, draw the needle back a little and it will unplug.

In figure 4, the needle tip can be seen resting against the inside surface of the jar. Then, when the solution is injected, it will run down the side of glass, giving an even inoculation. It is also important to add, that the vermiculite in this jar photo is very course. This makes the needle more visible for the demo. This type of vermiculite is best avoided.

3.1 Alcohol flaming technique

If the syringe needle is touched, flame the needle to sterilize it. An alcohol flame is a clean flame whereas a butain cigarette lighter leaves behind an undesirable soot residue. To produce a short burning alcohol flame, place a tequila shotglass upside down. Using an eyedropper, put a few drops of denatured alcohol fuel (hardware store) on the hollow bottom of the glass and touch it with a match or lighter. The blue flame will cleanly and

Figure 4: The position of the needle

safely sterilize small stainless steel tools. Heat the needle in the flame for a few seconds to resterilize it. There might be a few "pops" of boiling water spurt out of the needle, but the spores within the syringe are safe. If there is some left over spore solution, replace the needle guard and store the syringe for later use. Resterilize the needle immediately before re-use. Store the syringe in a dark, cool place.

3.2 Inoculation of PF jars without the lids

This technique can also be used if canning jars are not available ($\frac{1}{2}$ pint wide mouth canning jars are perfect and should be used at all cost). If regular drinking glasses are to be used - use regular tapered sided drinking glasses (8 ounce - 250mL)

Jars can be inoculated without using a lid with holes punched. Before trying this technique, inoculate with the punched lid first. That will show how it works without any problems (almost fail proof).

The only precaution to observe is to disturb the dry top vermiculite layer as little as possible, especially when removing the needle after the inoculation. The underlying substrate must not be exposed to the air. Carefully move any disturbed vermiculite back into place. If using a drinking glass or alternate container, cover the mouth with tin foil. Replace the tin foil cover after inoculation.

3.3 Incubation of inoculated jars

After inoculation of the jars, tighten the lid bands and retape the needle holes. Place the jars in a safe place out of direct sunlight. Indirect light is all that is required. If the temperature is kept around 70 degrees, germination will begin within 3 to 5 days. Germinating spores appear as small white fuzzy spots (after approx. 5 to 7 days), quickly growing and spreading with cottony white growth and strandy "rhizomorphs". After about a week (depending on circumstances like temperature) the inside of the jars should look like figure 5.

Any room temperature is O.K. If it gets cold indoors, over head light shinning down on the tops of the jars is a perfect heating technique for this culturing stage. A clamping type light with a reflector works well for this. If this is done, keep the temperature around 70 degrees (don't overheat the jars - monitor the temperature with a thermometer). A warm

Figure 5: After about a week

overall house temperature is fine. But in the overall view, cool temperatures are never a problem. The rule is to not overheat.

3.4 The canning jar lid (loose or tight)

There are two choices with the lids during incubation - tight or loose. With a very high moisture content (good for fruiting), a tight lid can cause water to collect in the bottom of the jar. This is to be avoided. If it happens, the lid should be kept on loose during incubation. Tape the canning jar lid to the band to make the lid act as a one piece lid for raising and lowering.

If the substrate is on the dry side, a tight lid will preserve the moisture content. It is all a matter of the balance between the water needs of the mycelium, the size of the jar, the available air space in the jar[1] and the type of vermiculite used. Only by simple experimenting and comparison can the right balance be found for a given set of conditions. Take notes and go with what fruits the best.

After the substrate turns white with the mycelium (2 or 3 weeks after inoculation), the jars are left to sit in *indirect* light. The mycelium will continue to infiltrate the substrate until it gets enough food to trigger the fruiting cycle. In less than a week to a few weeks after surface colonization of the cake, tiny white "pin" like structures begin to appear. This is called pinning. This is the beginning of the fruiting cycle. Soon after that, within the week, small round fungus growths appear that soon begin to turn yellow.

Lastly, "*primordia*" start to grow. These are tiny worm like structures with tiny reddish heads. These are the first mushrooms.

[1] often, a decrease in growth rate is witnessed. In that case, the tape on the holes should be removed, and the jar has to be turned upside down.

4 The birthday cake

Figure 6: Time to birth the cake

Figure 6 is of a $\frac{1}{2}$ pint PF substrate jar about 23 days after inoculation. The primordia have appeared and it is now time to birth the cake. Wait until you see this, and the fruiting will be maximized. The fruiting is fairly relative to the primordia that appear.

The best time to remove the fungus cake from the jar is when the primordia (tiny worm like structures with reddish heads) appear on the cake while still in the jar. Be careful not to damage them in handling. The rule is to handle with care.

Remove the lid. With a clean fork, scrape away the majority of the dry top vermiculite layer. There will probably be seen some wispy mycelium here and there in the top layer. Place an old jar lid over the jar mouth and turn the jar upside down. Lightly slam the jar down on a table cushioned with a magazine. The fungus cake will slide out onto the old jar cap (BIRTHDAY!). The jar cap functions as a base for the cake. When handling the fungus cake, be careful as not to squeeze and bruise it. Bruising results in a bluish mark. This fungus is resilient and can tolerate a certain amount of handling, but handle it as least as possible. The aroma is distinctly mushroomy, very pleasant.

As soon as the fungus cake comes out of the jar, daub the cake with a piece of loose tissue paper to soak up any water droplets that may have deposited on the cake as it comes out of the jar. Immediately after the birthday, place the cakes into the dual chambered terrarium for the fruiting cycle.

Figure 7 shows the cake a few days after the birthday. This is a healthy fruiting start. Some of these primordia will abort, but most will go on to full development.

Some of the first mushrooms to form are "aborts" (convoluted caps, gnarly stems and stunted growth), and ironically they are primo in magic alkaloids. They are even more powerful in magic than the stately beauties that will soon dominate the cake. The tiny "baby mushroom" aborts are likewise good. After witnessing the growth of the fungus, recognition of these aborts is easy. As long as the aborts are healthy and pure, they are primo. Also, another form of mutants will manifest, blobs of fungus with little or no cap, also good for harvesting. And along with these mutants,

Figure 7: Start of fruiting

appear the perfect specimens, the sporocarps.

It has been reported that Psilocybe Cubensis is a "weak" mushroom. PF and others have seen this to be not necessarily so. It all depends on how it is grown, on what medium and how it is harvested and preserved.

The secret to potent mushrooms is in their age when picked. It has been scientifically proven that the small immature specimens are significantly more potent than the larger mature specimens. Over half of the small primordia that first form will abort (cease growing, convolute and deform). Pick these before their heads turn black. A pointed knife blade works well for removing these high potency primordia. These are among the most potent. The abortive mushrooms are also high potency. Harvest them when they are young and before their heads turn black. When the fruitbodies are normal, harvest them before the veil under the cap breaks. The mushrooms will be smaller and their heads will be roundish. It is important to note that the mushroom cakes pictured in this book are all mostly well matured. While these mature specimens are beautiful and perfect, they are not as potent as the diminutive specimens. The mature specimens are good for spore collecting and showcasing but are weak in psychedelic potency.

Grow them on brown rice, harvest them when they are young and cool dry them with desiccant. When this is done, they are an entheogen of the highest order.

4.1 Time scale of the mushrooms

1. Spore inoculation to spore germination - within a week, at 70 degrees Fahrenheit (21 degrees Celsius).
2. Spore germination to complete colonization of the cake - about 2 to 3 weeks.
3. Colonization to fruiting cycle start - within 2 weeks.
4. The fruiting cycle lasts about 2 weeks.

After the initial flush, the mycelium cake begins to turn blue and no more mushrooms form. If the cake is thoroughly cleaned of aborts and stray fungus blobs after the initial fruiting and given the PF double ended cake casing tek, fruiting can be doubled or even tripled.

All in all, the process takes from 4 - 6 weeks from spore inoculation to fruiting.

4.2 Contaminant source identification

Contaminant invaders appear in various colours from pastels to black. If they appear, the culture is doomed. Bacteria contamination is detectable through the top dry vermiculite layer as a sour foul odor within two days after inoculation (and no spore germination). If the jar is bacteria contaminated, be careful in cleaning it. Keep a safe distance from the contaminated substrate. Don't inhale the bacteria and wash after touching it. Bacteria can be dangerous.

Control jar technique After the jars are steam sterilized, let them cool, tighten the lids and let them sit uninoculated for several days. Watch for any coloured growths or changes in the appearance of the substrate. The tell tale rancid odor of bacteria can be easily detected by loosening the jar lid and checking for the odor. If there is contamination at this stage, the sterilization technique needs to be checked. Most likely it will be a to short sterilization time. If there is a problem at this stage, lengthen the sterilization time. If the jars remain clean and unchanged, they are ready for spore syringe inoculation. If contamination occurs after inoculation, the syringe was contaminated or the dry vermiculite layer was breached during inoculation.

4.3 Non-germination of spores

1. The spore solution was not inoculated deep enough down into the jar. Instead of running down the side of the jar and inoculating the substrate cake, the solution was absorbed by the non-nutritive top vermiculite layer. To avoid this from happening, make sure that the spore solution flows down along the sides of the substrate cake by inserting the syringe needle so that the tip is below the non-nutritive upper vermiculite layer.
2. The substrate jars were not allowed to cool down after sterilization, killing the spores. Inoculate only when the jar feels cool to the touch.
3. There is evidence now that syringe boxes can be exposed to killing heat during transit (a very rare occurrence). The possibilities are such as over heated airplane cargo holds during intense heat waves or a superheated mail truck parked all day in the sun. Another possibility is that on arriving at the mail box, the syringe package was allowed to sit inside a broiling sun heated mail box, killing the spores.
4. Spore syringes can survive freezing, but extreme low temperatures are probably destructive to the spores.

5 The dual chambered terrarium

Figure 8: The dual chambered terrarium

5.1 The airtight aquarium lid (top)

(For a standard 10 gallon aquarium, see figure 8)

24″ × 14 $\frac{1}{2}$″ outside dimensions 21 $\frac{1}{4}$″ × 12″ inside dimensions (dimensions variable). The frame can be made of flat (unwarped) $\frac{1}{4}$″ thick board or 4 wood strips connected by screws.

The wooden lid frames' inner rectangular cutout must be LARGER than the top of the aquarium. Clear polyethylene plastic film is tacked to the underside (or upper side) of the frame so that the frame holds it tightly onto the aquarium top. The frame essentially hangs by the plastic film. A simpler alternative is to cover the aquarium top with saran wrap or something similar. The most important point to be stressed is that the aquarium must be sealable with no air leaks, for humidity retention.

5.2 The spray shield/chamber partition

(for a standard 10 gallon aquarium)

Use $\frac{1}{8}$″ thick clear acrylic (Plexiglas) window insulation available at most hardware stores. Have it cut around 15″ × 18″ (dimensions may vary - check the aquarium first). A loose fit is good as long as the cakes are protected from the direct spray.

5.3 Dual chambered terrarium techniques

The mushrooms get water from 2 sources; the substrate they grow on and the air that surrounds them. The surrounding air must be highly humidified. The fungus needs to bathe in a shroud of floating water molecules. 100% humidity is where there is the maximum number of water molecules floating amongst the air atoms. The dual chambered terrarium easily achieves these conditions.

It all starts with the spray from the hand sprayer. The first rule is to never directly spray the fungus. This initial spray is comprised of water droplets that are giant ponds of water in relation to the fine mycelial networks of the fungal threads. In culture, the droplet of water will drown the micro world of the fungal structures and thereby inhibit or contaminate growth. But the airborne molecularized water floats into the fine

structures and gives the fungus humidity as needed. Molecularized water is another way of describing water that has evaporated into the air.

The spray that comes out of the spray bottle must be molecularized for the fungus. The spray shield and the primary chamber accomplish this. The primary chamber receives the initial spraying. As the spray strikes the shield, it is broken down into a finer mist which flows around the sides of the spray shield into the secondary chamber where the fungus is bathed in the fine humidity safely away from water droplets. In a matter of time, this humidity will condense out onto surfaces inside the terrarium and drip down. The spray shield is slanted and therefore acts as a drip shield and roof, so the more condensation the better.

5.4 Spraying procedures

First, before placing the cakes into the terrarium, spray all the inside surfaces of the terrarium, including the spray shield and lid. Insert the fungus cakes and put the spray shield and lid in place. Then, slightly lift up the lid and insert the nozzle of the water spray bottle in between the lid and the top of the aquarium and vigorously spray downwards into the middle of the shield. After about 5 seconds of spraying, immediately withdraw the sprayer nozzle and let down the lid to seal the swirling mist inside the terrarium. Come back after a few minutes and give it another spraying if desired and a third if the terrarium is to be left untented until the evening. To maintain a high humidity try to spray 2 times a day, and the more the better. Compensate for a lack of spraying during the day by spraying several times in the evening. Make sure that all the inside surfaces of the terrarium are foggy or dripping with water. This in itself helps generate humidity.

It has been seen that mushrooms will grow in a properly set up dual chambered terrarium, with only one good spraying a day - and even less than that!

Each time the terrarium is sprayed, the fungus should be ventilated. To ventilate, take off the lid, and while holding the spray shield vertically, fan the chamber with a piece of cardboard, and then spray as above. Also, the water that collects in the bottom of the terrarium must be siphoned out (prevents bacteria buildup). This can be easily done using a rubber bulb battery filler (auto parts store) or a rubber bulb type enema bottle.

Expose the terrarium to normal room light (indirect sunlight). A small low wattage fluorescent plant light will make the phototropic mushrooms grow upwards. Leave it on all the time if desired.

5.5 Heating

The main rule is to not heat the dual chambered terrarium. Any direct heating works against the humidification and adds a drying influence. Do not use heating cables, heat pads or blankets. Don't shine light directly down into the terrarium. Keep any plant grow light (low wattage only) a safe distance from the terrarium. These fungi grow well at 60 degrees Fahrenheit (16 degrees Celsius). PF has even seen them growing perfectly at temperatures cooler than 60 degrees. They grow slowly when they are cool. When warm or at heated room temperature, they grow very fast. Strive for a growing temperature between 65 and the up-

per 80's (18 - 30 degrees Celsius). A too hot terrarium will result in lots of spreading mycelium, but no fruiting.

5.6 Symptoms of low humidity

When the humidity is a bit low, but not low enough to stop fruiting, the mushrooms can have fuzzy white mycelium growing on the tops of the caps. When this occurs, the cap looks like it has a crown of white hair. This is not contamination. This white fuzzy mycelium is perfectly good and does not detract from the mushrooms quality.

Deformed, convoluted, and withering mushrooms and primordia are signs of low humidity. For the best growth, the humidity has to be very high.

5.7 The Rich Mans' Terrarium

Figure 9: The cropdome

Figure 9 shows the terrarium that was used in the perlite and terrarium tests. I found it at a new and used resteraunt supply store in Seattle for $25. This is a covered food display tray.

It works great with perlite (and without) and holds 9 half pint cakes. The one in figure 9 has 7 cakes. The cakes are post initial flush and the fruitings are secondary fruitings. The fruitbodies that appear late are always superb in form.

If you can't find one of these in your local town, you can order one for around $75 (hence - the "richmans'"). Call the manufacturer (Cal-Mil) in California at 1 800 321 9069. They will tell you where you can order it (from one of their distributors near your town).

Unfortunately, sometimes a distributer will require a minimum of an order for two. But fortunately, the terrarium they will send you for the above price is bigger than the one pictured. It has room for several more cakes, making for a goodly capacity. All the shrooms pictured at this site were grown in one of these.

The catalog numbers are: 314-15 – the ”connoisseur cover” 316-15 – ”Deep Tray” bottom half The unit is 15 inches in diameter and about that tall.

To use this terrarium, first spray the insides. Place the cakes in. Hold the cover above the tray and spray a fine mist into the air about 2 feet above the cakes in the tray and immediately lower the cover down onto the tray - trapping mist. Air and mist once a day. But what is so cool about this, is that neglect goes a long way! (set it up and leave it).

Yeah, I know it costs, but it works so nicely, and it makes a nice coffee table display. If your landlord comes by to inspect, he will see it, look down and say, ”hey, nice shrooms, what kind are they”? Then you say, ”I got it from a science catalog company and it is a new miniature fungi growing kit and the shrooms are not edible - just wild”. (or something absurd like that). Then your landlord will look approvingly around, notice the neatness and tidyness of your domicile, and leave, little knowing that he just observed the food of the gods.

5.8 The Ultra Richmans Terrarium

Figure 10: The best terrarium

This terrarium (figure 10) was made by a plastics fabrication expert. It isn't cheap (like a poor mans Whalmart plastic storage box) but if you can find the right person - the cost is a bit more than the richmans dome above. It is made out of acrylic clear plastic. It is one piece, with a removable spray shield. At the top, is a spray hole with a rubber stopper. It is designed to hold one fruiting cake to maturity, but it can hold 4 cakes tightly. The cake inside is a first flush PF spore race cake - typical of a first flush obtained with the PF-TEK.

The terrarium is open bottomed so it fits over the cakes that sit on a tray. This is the most fool proof terrarium one can have. And it can be made bigger - as big as a ten gallon aquarium or larger. The plastics expert can make one just by looking at the photo and you giving him

the dimensions that you want or by giving him the tray that you have to fit the terrarium to it. Very tricky - but it isn't hard to find someone (a professional) who can do it if you live in any kind of large town.

6 Cool desiccation (drying) of mushrooms

The immature specimens are the best in quality, digestibility and potency. They are characterized as being very light in colour with white stems and light coloured caps. The cap will spread out after the veil breaks. Just before or right after the veil breaks is a good time to harvest. The gills on the underside of the cap will be light in colour. The mushrooms will be conical shaped and sporulation hasn't really begun yet. These are the mushrooms that are the best for harvesting.

Figure 11: Drying the mushrooms

- The easiest way to dry the fungi is to place them on a wire screen with air available to all sides (figure 11). Never dry them in an oven or use hot air dryers. The heat leaches the chemical constituents and reduces their quality.
- Using a frost free (dehumidifying) refrigerator works but it is time consuming and then everyone doesn't have a frost free fridge.
- Using desiccant to cool dry mushrooms is overall, the best drying technique.

Materials needed:

1. Desiccant
2. Wire screen
3. Plastic tub or container
4. Plastic bag with tie off.

Desiccant sources:

- "DRIERITE" desiccant. (chemical and science supply retailers). It is the universal lab desiccant.
- Silica Gel granules - desiccant. (Chemical and science supply)
- "DAMP GONE" - (looks like kitty litter - for drying closets and damp places in the home) - available at well stocked hardware stores. This is inexpensive desiccant but works as well as any.

Note: These products might have toxicity warnings - (don't breathe the dust and try not to touch it directly - it dries skin.). Follow those rules, but know that desiccant in an airtight box and under a screen will do nothing to the fungi except dry them. It is completely safe for this use.

What desiccant does, is absorb moisture out of the air. As the fungus transpires moisture, the moisture is immediately absorbed back into the desiccant, drying the fungi. Desiccant can be reused and lasts indefinitely. After use, the desiccant is heated, dried and stored for future use. Store it in an air tight container so that it stays dry and ready for use. Heat the desiccant in an oven as instructed by the manufacturer. This preheating should be done before the desiccant is used because when it is purchased - it is usually somewhat damp which will thwart its function for drying air.

Figure 12: A drying box

In drying a medium sized mushroom such as Psilocybe Cubensis, use a 1 inch layer of desiccant on the bottom of the container, under the mushrooms. Place the mushrooms on a wire screen and lay them on the desiccant that is in the container (fig. 12). Put the container with the shrooms and desiccant into a plastic bag. A garbage bag type wire tie is sufficient to close the bag. If a clear plastic bag can be found, use that to observe the drying process. After 24 hours, a little shriveling of the shrooms can be seen. About 4 or 5 days later, the shrooms will be dried rock hard. To check the drying - the stem should snap cleanly when bent.

For the best alkaloid preservation technique, the desiccant box can be put into the refrigerator and the mushrooms dried at near freezing temperatures.

Pre drying the mushrooms in the air on a wire screen works very well if the the room humidity is not high. After a couple of days, the shriveling fungus can be quickly and completely dried in the desiccant box.

Mushrooms dried in this way lose hardly any chemical constituents and their truly desiccated state preserves them in their prime for months.

Store them by sealing them in plastic bags or keep them in canning jars with the rubber edged canning lid on tight (as in figure 13: dried shrooms in little bags stored on top of desiccant). The freezer is a good place for preservation, but make sure the fungi are tightly sealed in their containers to protect them against the moisture in the freezer.

Figure 13: Storing the dried mushrooms

7 Spore printing and spore syringe preparation

The mature specimens are good for spore production, but are not as good for consumption (weaker potency). They are characterized as becoming darker, with dark bluish colours appearing on the caps and stems. The cap upturns and reveals gills darkening a deep brown colour. The mushroom will look like an umbrella that has turned up edges. On the stem can be seen the purple deposits of the dropping spores. Mature adult mushrooms release spores by the millions. In the area around the mushrooms can be seen a deepening colour of purple. As the spores fall and collect they will colour deep purple. This is the signal that the mushroom has matured and is now in its sporulation cycle. This is the time to take their spores.

7.1 Spore printing equipment

- Kerr $\frac{1}{2}$ pint wide mouth (low form)
- Canning jar (any suitable jar is OK)
- Finger nail cuticle scissors (cosmetics - drug stores)
- Alcohol, tequila shot glass and eye dropper.

1. Presterilize the jar and regular metal lid (rubber edge up) in a small toaster oven at around 300 degrees Fahrenheit (150 degrees Celsius) for around a half hour. Keep the lid loose during the sterilization cycle. When the jar has cooled down, tighten the lid until it is time to use the jar for a spore print. The rubberized edge will be a bit melted, but that won't be any problem in this technique.

   Note: What follows is a sterile technique. The first rule that must be always followed is to wash hands prior to sterile work. Hands are a prime source for bacteria and microspore contaminants. Sterilize all the work surfaces with rubbing alcohol. Minimize drafts. Try for a still air environment. Don't breathe on the work. Run a small home appliance style HEPA air cleaner (99.97% rated efficiency, available at drug and department stores) for a few hours in a closed room to clean the air before doing sterile work.
2. Flame sterilize the scissors with an alcohol flame and snip off the mushroom cap. Cut the top of the stem as far up into the cap as

Figure 14: Making a spore print

possible so that the gills of the mushroom will sit flat on the surface of the jar bottom. With quick and sure movements, place the cap into the jar and place the lid on loosely (see figure 14). Pierce the top of the cap with a straight pin to pick it up and handle it.

3. Leave the jar with a loose cap for a couple of days in a draft free area away from direct sunlight. After the print is taken, quickly and with as little air disturbance as possible, remove the jar cap and extract the mushroom cap from the jar. With a loose jar cap, let the jar sit in a draft free place to dehumidify for a few days before sealing it up (with tape) because there will be some residual moisture left behind on the spores and glass. Store the spore print jar at room temperatures in a dark place away from sunlight. Don't store it in a refrigerator.

Psilocybe Cubensis spores begin to degrade a few months after they are taken. After approximately 1 $\frac{1}{2}$ years, spore germination will be greatly reduced or won't occur at all. Germination is massive and quick when the spores are fresh.

7.2 Making a spore syringe

Materials list:

1. Spore print in jar.
2. Sterile syringe with water for injecting water into the spore print jar.
3. Sterile syringe for loading spore solution out of the jar.
4. A small Pyrex glass stirring rod (science - lab supply).
5. Alcohol, tequila shot glass and eye dropper.
6. Lid with two holes. Prepare this lid by drilling a hole in the center of the lid to fit the Pyrex glass stirring rod. Punch the second hole near the edge of the lid (rubberized edge up) to fit a syringe needle.

Syringe preparation Boil a pot of water. Draw boiling water into a syringe and squirt it out several times. Refill the syringe with boiling water, replace the needle guard and wrap the syringe in tin foil. Prepare several syringes like this. Drop the syringes into the boiling water and boil them for one hour. Let them cool before using.