PSILOCYBIN PRODUCTION

ADAM GOTTLIEB

TWENTIETH CENTURY ALCHEMIST SERIES

PSILOCYBIN PRODUCTION

ADAM GOTTLIEB

It is not difficult to cultivate the mycelium of any of the psychoactive mushrooms. The right knowledge, a little equipment, and one mushroom or a few spores is all it takes.

PSILOCYBIN PRODUCTION presents a method of psilocybin production and extraction in clear and simple terms. Complete descriptions of the following procedures are given:

- *locating and gathering mushrooms*
- *developing stock cultures for inoculation*
- *cultivating, harvesting, and drying mycelium*
- *extracting active alkaloids*
- *using existing cultures to seed new cultures*
- *setting up a large scale psilocybin production*
- *fruiting mushrooms from mycelia*

$9.95 ISBN 0-914171-92-5

50995

9 780914 171928

PSILOCYBIN PRODUCTION

RONIN PUBLISHING

$9.95 USA $15.50 CAN $20.00 EUR

www.roninpub.com

Psychedelia / Gardening

THE PSILOCYBIN PRODUCERS GUIDE

How to produce 5000 doses of organic psilocybin
in a small room every week

by

Adam Gottlieb

1976

PSILOCYBIN AND THE LAW

The present drug laws are a pathetic mess. The old adage that ignorance of the law is no excuse becomes a ludicrous statement when the laws themselves are rooted in ignorance. One classical example of this is the classification of the stimulant Cocaine as a narcotic. One is reminded of the King in Alice in Wonderland who made up his own language as he went along with total disregard for the accepted definitions of words. I will not even go into the question of whether any law enforcement agency has the moral or Constitutional right to dictate what substances we may or may not take into our own adult bodies. Any modern individual whose mind is not immersed in the slavish dung pit of Dark Age unreasoning knows that reliable education − not criminal penalization − is the answer to whatever drug problems exist. Nevertheless, we must contend realistically with the powers that unfortunately be at this time. They are the ones with the badges, guns, gavels and goons.

Because of the afore mentioned ignorance of our lawmakers it is difficult to determine how the use of certain hallucinogenic substances would be treated in the courts. Possession of psilocybin and psilocin (misspelled in the U.S. Code as psilocyn) is a felony under Title 21, Section I, (C) of the United States Code (1970 Edition). Psilocybe Mexicana is also illegal. There was sufficient ignorance on the part of the lawmakers not to include the many other mushroom species containing psilocybin and psilocin. Theoretically the possession of any psilocybin bearing mushroom would be the same as possessing the alkoloid itself. But when it comes to prosecution it does not necessarily work like that. Lysergic acid amides, which occur in morning glory seeds, stems, and leaves are also illegal, but there is no way to prevent gardeners from raising this ornamental flower. It is also illegal for anyone in the USA to possess mescaline. Peyote, which contains mescaline, is legal for bonafide members of the Native American Church when used ritual−istically, but no member may possess extracts of the cactus or the drug mescaline. Peyote is illegal for non−members, but San Pedro and several other species of Trichocereus cacti also contain mescaline and are available from many legitimate cactus dealers. It would be clearly illegal for anyone to extract the active principles from any of the above mentioned plants. And it would be illegal for anyone to extract psilocybin and psilocin from mushrooms or mycellium as described in this guide. Anyone found operating a large scale mycelium farm could very easily be prosecuted for intent to manufacture psilocybin and psilocin. There are also many different state laws which must be considered before doing anything psilocybin bearing mushrooms. There are, however many Nations which have no laws regarding these substances. We are not judges or attorneys and are not trying to offer clear interpretations of the law. Rather we have mentioned these points to give some indication of the legal pitfalls which surround the application of the activities described in this guide. Furthermore, laws may have changed for better or for worse. We, the author and publisher, are not recommending or endorsing the application of the information in this guide especially in places where there are laws proscribing these substances. We offer this information for the sake of pure knowledge because it is our Constitutional right to do so. We do not encourage the violation of any existing laws.

FINDING THE MUSHROOM

All it takes is one mushroom or a few spores and from this one can quickly develop a culture that will continue to produce as much psilocybin as one desires for years to come. Because the common San Ysidro mushroom, psilocybe cubensis ..Singer (Formerly stropharia cubensis ..Earl) is the most easily obtainable, the most readily cultivated, most disease resistant, and psychoactively strongest species we have geared our instructions to it's use. There are, however, numerous other species which contain psilocybin. In case one of these is all that is available, we give for several of these pertinent information such a relative potency, where and when to find specimens, what growing conditions (medium, temperature, lighting, etc.) it favors and how resistant it is to contamination. The states, provinces, and regions named are by no means the only places where the species is to found. They are places in which there have been numerous reports of findings. They are given here to give a general idea of the type of terrain and climate the species favors. In cases where ideal cultivation temperatures and growing conditions are not given much can be surmised by considering the environment in which that species thrives.

Psilocybe cubensis can be found in many parts of the United States, Mexico, Colombia, Australia, and even Southeastern Asia. It is usualy found growing on or near cow dung in pastures during warm rainy periods from February to November. There are several species of mushroom which occur on cow dung, but fortunately none of these bear much resemblance to the San Ysidro.

There are numerous toxic mushrooms growing around us. Some of these could be mistaken for some of the other psilocybin fungi mentioned in this guide. It is essential that the mushroom hunter learn to use an identification key. A key is a listing of the various features which will positively identify a given species. If a specimen does not confirm in every respect to the key, it must not be used. There are several excellent keys to be found on most library shelves. One that we recommend is "Keys to Genera of Higher Fungi" by R. Shaffer, 2nd ed. (1968) Published by the University of Michigan Biological Station at Ann Arbor. We also recommend a thorough reading of the most helpfull book "Poisonous and Hallucinogenic Mushrooms" by Richard and Karen Haard, available for $3.95 from Nature Study Institute, PO Box 2321, Bellingham, Washington 98225. It is further suggested that after identifying the specimen it should be brought to an expert mycologist to be absolutely certain of it's identity.

Many books on hallucinogenic mushrooms suggest a simple test for psilocybian species which involves breaking the flesh of the specimen and waiting about 30 minutes for a blueing reaction to take place. The blueing is due to the oxidization of indole based substances in the fungus. Although it is true that most of the psilocybin-bearing mushrooms will respond positively to this test, other species may do the same. The poisonous Eastwood Boletus blues upon exposure of the inner tissues to oxygen as well as does any psilocybin mushroom. Another test which is often given in mushroom manuals is treating the exposed tissues with Metol, a chemical used in photo developers. It hastens the blueing of psilocybin mushrooms, and supposedly one can do a blueing test with it in a few minutes that would otherwise take 30 minutes or more. Any mushroom, however, which contains indolic substances of any sort will respond positively to this test. Since indole-based amino acids such as tryptophan are found in most living organisms this test is rather useless.

There is actually no field test for psilocybin mushrooms. There is however, a relatively simple test for the presence of psilocin and psilocybin that can be carried out at home by anyone who has some

familiarity with paper chromatography. The mushroom sample is dried, pulverized, and extracted into a small amount of unheated methanol by shaking for half an hour. After the debris in the methanol has settled the paper is spotted with the top fluid in a zone about 2mm. After treating the the spotting zone with water saturated butanol for about two hours, the solvent front 7–8 cm from the spotting zone would contain the psilocin and psilocybin if they were present in the specimen. After drying the paper with a hair dryer on warm, this outer zone is sprayed lightly with a saturated solution of p–dimethyl–aminobenzaldehyde in alcohol and then again with 1 N hydrochloric acid. The paper is then dried again as before. Where psilocybin is present a reddish color will develop. The presence of psilocin will be indicated by a blue–violet zone.

DATA ON VARIOUS PSIOCYBIAN SPECIES

CONOCYBE CYANOPES:
Found from May through September usualy in dense shade scattered among mosses, and in wet soil around bogs, swamps, and ditches in the northwestern USA and as far east as Michigan. Carpophores grow well in sphagnum moss having a range of pH 7−8.

COPELANDIA CYANESCENS:
Found in early summer through late autumn scattered, grouped, or clustered on cow dung, or rich soil in Florida and other southern states. Spores germinate easily easily on all agar media. Optimum growth occurs on MEA at 80 degrees F. Carpophores can be produced on uncased compost or on rye.

PANAEOLUS FOENISECII:
(Also known as PANEAOLINA FOENISECII or PSILOCYBE FOENISECII, and commonly known as haymower's mushroom or harvest mushroom)
Found in late spring and early summer, or in July, August, and September during cool, wet seasons scattered or grouped in large numbers on lawns, pastures, and other grassy places throughout the USA and in Quebec. Tests on specimens found in Washington revealed no psilocybin, but eastern specimens were potent.

PANAEOLUS SPHINCTRINUS:
Found in summer and autumn in small groups in forests, pastures, fields, and roadsides almost always on cow dung in many temperate parts of the world.

PANAEOLUS SUBALTEATUS:
Found from spring to autumn grouped or clustered often in rings up to two feet in diameter on open ground, freshly manured lawns, straw piles, all types of compost, dung piles, and roadsides in Ontario and throughout the USA (especially in Massachusetts, Maryland, New York, Ohio, Michigan, Washington, and Oregon). Optimum growth on MEA is at 86 degrees F. It occasionally occurs as a weed mushroom in commercial mushroom houses.

PHOLIOTINA CYANOPODA:
Found in August through September solitary to clustered on lawns in such diverse parts of the USA as New York, Washington, and Colorado.

PSILOCYBE BAEOCYSTIS:
Found in autumn and winter, solitary, grouped, or clustered on earth, lawns, mulch, and decomposing forest wood near scattered trees especially conifers − in western Oregon and Washington. It does well on Agar media at 77 degrees F. This is a potent species containing Psilocybin, psilocin, baeocystin, and nor−baeocystin. Perhaps it is because of the latter two alkaloids that it is the most visually hallucinogenic of the psilocybin mushrooms. There is a report that in 1960 a six−year old boy died after eating a large number of these mushrooms. There has never been any other indication that these alkaloids are dangerous. Until there is further clarification of this question, we advise that anyone using this species proceed with caution by starting with small doses and progressing gradually to larger ones. This is especially important when using the extracted crude alkaloids which may contain large concentrations of the baeocystin alkaloids.

PSILOCYBE CAERULESCENS:
Found in the summer during rainy season, grouped or clustered but rarely solitary, mostly in shady places on soil, sugar cane mulch, recently turned earth or stream banks − in Alabama, northern Florida and Mexico. The Mexican variety P. CAERULESCENS var. MAZATECORUM is known locally as "Durrumbe", which means "landslides." There it is often found among landslides, or near corn or coffee plantations.

The mycelium does best on MEA at 81 degrees F. Thermal death occurs at 95 degrees F. It is almost impossible to produce carpophores on sterilized rye medium. They can be grown on vegetable compost in dim light, but the incubation period is long (55−85 days). Although this species is resistant to white mold it's long incubation period leaves it prone to other diseases. It is not one of the more potent species.

PSILOCYBE CAERULIPES:
Found in summer and occasionally autumn solitary or clustered on decomposing logs and debris of hardwood trees (especially birch and maple) in New York, New England states, Ohio, Michigan, North Carolina, Tennessee and Ontario.

PSILOCYBE CUBENSIS var. CYANESCENS ..SINGER (formerly STROPHARIA CUBENSIS ..EARL):
Found from February to November in compact groups in clearings outside forest areas, on cow dung, or horse dung, in rich pasture soil, on straw, or on sawdust/dung mixture in Mexico, Cuba, Florida and other southern states. It grows well on MEA at 86 degrees F. Carpophores appear in 4−8 weeks. Thermal death occurs at 104 degrees F. Carpophores larger than wild specimens can be produced by inoculating vegetable compost in clay pots with agar grown mycelium, casing with silica sand/limestone mix, and incubating 4−6 weeks in daylight at 68 degrees F. It does poorly in darkness. It is a potent mushroom and very resistant to contaminants.

PSILOCYBE CYANESCENS:
Found in autumn scattered, grouped, or clustered in woods, on earth, among leaves and twigs, and occasionally on decomposing wood − in northwestern USA.

PSILOCYBE MEXICANA:
Found from May to October isolated or sparsely at altitudes from 4500 to 5500 feet, especially in limestone regions, among mosses and herbs, along roadsides, in humid meadows, in cornfields, and near pine forests in Mexico.

PSILOCYBE PELLICULOSA:
Found September to December scattered, grouped, or clustered on humus and debris, in or near conifier forests in northwestern USA and as far south as Marin County, California. This is a small but potent species.

PSILOCYBE QUEBECENCIS:
Found from summer to late October scattered in shady areas at forest edges, on sandy soil containing vegetable debris regularly inundated by river flooding, and on decomposing wood and debris (especially birch, alder, fir, and spruce) in the Quebec area. It thrives at lower temperatures than other psilocybe species and produces carpophores at air temperatures of 43 to 59 degrees F.

PSILOCYBE SEMILANCEATA:
Found August through September often in large groups on soil, among grasses, in clearings, pastures, meadows, forest edges, open conifier woodlands, and on roadsides − but never on dung − in New York, northern USA, British Columbia, and Europe. Generally regarded as one of the less potent species, but is sometimes quite potent.

PSILOCYBE STRICTIPES:
Found in October rather clustered on soil or on decomposing wood and debris, on conifiers and some other trees in northwestern USA (especially in Oregon). It closely resembles P. Baeocystis, but has a longer stem. It tends to be as visually hallucinogenic as that species and probably contains the same or similar baeocystin alkaloids.

PSILOCYBE SYLVATICA:

Found in September and October in small compact but unlustered groups in woods on leaf mold, debris (especially beech wood), around stumps and logs, but not usually on them − from New York to Michigan and as far north as Quebec and Ontario. This mushroom is small and is often mistaken for P. Pelliculosa.

The species discussed above are only some of the more commonly known ones with hallucinogenic properties. There are recognized among the psilocybin bearing mushrooms 40 species of Conocybe usually ocuring in forests, pastures, gardens, dung areas, sandy soil, ant hills, decayed wood, and charcoal and having a cosmopolitan range; 20 species of Panaeolus found on soil and dung and having a cosmopolitian range; 40 species of Psilocybe found on soil, moss clumps and organic substrata such as dung, rotting wood, bagasse, and peat ranging from the artic to the tropics; and 9 species of Stropharia found on soil, dung and sometimes on leaf mulch and rotting wood and having a fairly cosmopolitian range.

PURE CULTURE TECHNIQUE

The most difficult part of psilocybin mushroom cultivation is the observance of the rules of pure culture technique. These are the sanitary code of mushroom cultivation. There are usually many varieties of bacteria and fungal spores in our environment; floating in the air, clinging to our hands and clothing, issuing from our mouths with every exhalation. Extreme measures must therefore be taken to keep these out of our mycelial cultures, which they would rapidly overrun. The following points should be diligently observed. Work in a clean, uncluttered, dust free room. Immediately before work wash the work table and spray the room with disinfectants. Scrub arms, hands, and nails with disinfectant soap. Wear simple clothing. A freshly cleaned short−sleeve T−shirt is ideal. Gargle with antiseptic mouthwash and cover the mouth and nose with a clean cloth or disposable surgery mask. Cover the hair with a surgical cap or shower cap. Allow no drafts in the room. close all doors and stuff all door jambs. Let no flies, animals, or unnecessary people in the room. Let only sterilized equipment touch the medium or inoculum. Don't lean over your work. Avoid all swift movements that may cause a draft. If possible have a hood constructed around the work table or a screen or curtain surrounding it. Be neat and keep all materials within reach. Keep all equipment about three feet away from the work. Do not permit anyone to enter the room while work is in progress.

STERILIZATION

All utensils used in the cultivation of mycelia must be sterilized by heat before use. Glassware must be boiled in water for 30 minutes. Metalware used repeatedly must be held in a flame until glowing and then allowed a moment to cool before making contact with any cultures or specimens. When the inoculation loop has been used to transfer a fragment of mycelium it must be flame sterilized again before touching the next fragment. All medium containers must be sterilized after the medium has been poured. This process is known as autoclaving. Containers no more than half full with medium are placed in a canning type pressure cooker. The lids of these must be loose enough to allow escape of internal pressures. Otherwise the containers may crack. Seal the lid of the pressure cooker. Keep the stopcock valve open. Using high heat bring the cooker to boiling so that thick steam comes through the vent. Close the stopcock and let the pressure rise to 15–20 pounds. (250 Degrees F.) for 30 minutes. This should be enough to destroy any foreign spores or lifeforms. Any higher temperature or longer period would cause the dextrose or maltose sugars to carmelize. This would inhibit growth and psilocybin production of the mycelium. When the autoclave period is up turn off the heat and let the cooker cool to room temperature. Do not release the stopcock until everything has thoroughly cooled or the sudden change in pressure will cause the containers to boil over. Discard any containers that have cracked during sterilization. Keep all containers of medium at room temperature for three days to see if any foreign molds develop. If they do occur discard the medium in the contanminated jars and thoroughly clean and sterilize such jars before using again.

MAKING A SPORE PRINT

A spore print is a collection of spores on a flat surface. It can serve several purposes. It can be used to assist identification of the specimen by observing its color or if made on a glass slide, by studying the shapes of the spores under a microscope. Mycological identification keys include descriptions of spore prints and microscopic spore features for different species. Spore prints are also the standard method of collecting spores for later germination on agar media. A print from a single mushroom cap contains millions of spores. Many mushroom lovers are now making spore prints on paper from species available in their locales and mailing them to cultivators in other areas where such species are not found. Secret spore exchange correspondence clubs are becoming quite the vogue and will probably be more common in the very near future. A word of caution regarding this practice should be given, however. Do not assume that spores received in this manner are from the species the sender claims they are. If the sender has misidentified the specimen and the recipient cultivates and ingests mycelia or extractions therefrom, the result may be disasterous. Furthemore, I would not put it past some anti-drug fanatic to purposefully disseminate spore prints of dangerous mushrooms to amateur cultivators. This could result in sickness and death for thousands of persons.

To make a spore print take a mushroom with it's cap fully opened and gills exposed. With a sharp sterilized blade cut off the stem as close to the gills a possible. Place the cap gills-down on a clean, white sheet of paper, or on a sheet of glass that has just been swabbed with alcohol, or on two or four sterilized microscopic glass slides. Cover the cap with a clean, inverted bowl or bell jar to prevent drying of the cap and intrusion of foreign organisms. Let this stand as such for 24 hours. If a good spore print has not been formed after this time, tap the cap lightly with the flat side of a knife or spatula. This should shake loose many spores. If the print is made on glass, cover it with another glass sheet immediately after removing the cap to prevent contamination. If microscopic slides are used, place two face to face and seal the edges with tape. If paper is used. fold it several times so that the print is well inside.

PREPARATION OF MEDIA

PDA (Potato Dextrose Yeast Agar): Wash 250 grams of unpeeled potatoes and slice them 1/8 inch thick. Wash these several times in cool tap water until the water is clear. Drain the slices in a collander and rinse once with distilled water. Cook the potato slices in distilled water until tender. Strain the cooking liquids through a flannel cloth or several layers of cheesecloth and collect the liquid in a flask. Rinse the boiled potatoes several times with distilled water, add these rinse waters to the liquid in the flask, and discard the potatoes. Add enough distilled water to the flask to make one liter. Bring the liquid to a boil and add 15 grams of agar, 10 grams of dextrose, and 1.5 grams of yeast extract. The agar must be added slowly and carefully to prevent boiling over. While the liquid is hot, pour it into petri dishes or other culture containers. Each should be filled half way.

PDY (Potato Dextrose Yeast broth): PDY broth is made in exactly the same manner except the agar is omitted. Mason jars are filled half way with the hot or cool liquid.

MEA (Malt Extract Agar): To one liter of gently boiling water (distilled) add 20 grams of malt extract, 20 grams of agar (slowly, carefully to prevent boiling over), 100 mg of potassium phosphate dibasic (K_2HPO_4), and 100 mg of calcium carbonate. While still hot pour the liquid into the culture dishes.

EQUIPMENT

Most of the equipment described in this guide is readily available at reasonable prices. One quart size mason jars can be purchased from many stores including Sears for about $2.98 a dozen. If a large scale Psilocybin farm is being set up, a greater number of jars could be obtained from a Wholesale outlet or bought at a discount from the retailer. Pipettes, inoculating loops, petri dishes, agar, and other materials (including pre-mixed media) are found at many scientific supply houses or can be ordered from Difco Laboratories, Inc., Detroit, Michigan 48201.

If Petri dishes are not on hand, there are several other containers that can substitute. Baby food jars 1/4 filled with agar media are excellent. Test tubes can be filled 1/3 with hot agar medium, stopped with cotton, autoclaved and allowed to cool while standing at a 17 degree angle. These are known as slants and permit a maximum surface area. A wooden rack can be easily constructed to hold slants at this angle. Baby bottles with a steam sterilizer can be bought almost anywhere. These come in sets of nine or ten bottles. The tip of the rubber nipple should be cut off and a wad of clean cotton pulled through from the inside leaving about 1/2 inch sticking out. The bottles are filled 1/3 with agar medium. After sterilizing the bottles should be kept at a 17 degree angle. A large pressure cooker - the type used for canning and jarring - can be used for autoclaving mason jars of broth medium.

STARTING THE CULTURE

Upon obtaining one or more specimens of a psilocybin bearing mushroom one can begin to cultivate as much of the hallucinogen as is desired. Any part of the fungus can be used for inoculation. If the spores are used, consideration must be given to the natural life cycle of the mushroom. A single cap contains millions of spores, and any one of these will germinate in the medium to form a mycelium. But this mycelium will consist of what is known as monokaryotic tissue. Such a mycelial organism will grow for a while, but unless it mates with another compatible monokaryotic mycelium and forms a dikaryotic structure it will eventually perish. To develop a culture from spores proceed as follows: Scrape the spores from the print into about 10 ml of sterilized water. Shake well. Add 90 ml of sterilized water and shake again. There will be millions of spores in this solution. Have ready several petri dishes or other suitable containers as described previously containing sterilized agar medium. Lift the lid slightly on each container and with a sterilized pipette or syringe place a drop of this spore water on three or four different parts of the agar surface, then cover the container immediately. Let the dish stand at room temperature for 3–5 days. Radial growths of monokaryotic mycelium will occur at each inoculation point. When any two mycelia have grown to the point of making contact with each other mating (somatogamy) has taken place and within a few days these united mycelia will have become dikaryotic organisms. Any portion of this mycelial tissue can now be used to seed new cultures as described later.

If a portion of one of the carpaphores gathered in the field is used to inoculate the agar, mating is not required. The tissue of mature fungus is, of course, already dikaryotic. To avoid contamination only inner tissue is used. Place the mushroom cap gills–down on a clean work area at least three feet away from any equipment. Wipe all dirt an slime from the cap with a Q–tip and swab it's whole surface with a seven percent iodine solution. Pin the cap to the Table top by inserting three disecting needles at equilateral points. Sterilize an X–acto blade in a flame, let it cool for a moment, then carve the outer skin of the mushroom. Cut out tiny pieces of the inner mushroom flesh each the size of a match head. Spear each piece with the blade point, raise the lid of the petrie dish slightly, press the tissue firmly into the agar surface, and close the lid immediately. Place all dishes so inoculated on the incubation shelf at room temperature. The mycelium must breath as it grows, so do not cap the lids too tightly. When the radial growth of the mycelia appear on the agar surface (3–5 days) these stock cultures are ready for transferring to the broth jars. If any stock cultures are not going to be used immediately, tighten their lids and place them under refrigeration. They can be kept this way for about a year.

RAISING CROP CULTURES OF MYCELIA

The task now is to select the most vigorous appearing mycelia in the dishes. This means the largest and fastest growing specimens and, of course, those not contaminated by foreign molds. Contaminants are not difficult to detect because their appearance differs greatly from that of the mycelia. Mycelia are pure white fibrous mats sometimes having a light bluish tinge.

Contaminants may appear as rapid-growing, tiny, white circular spots with blue-green centers, or as surface scums or fuzzy clusters of either gray, black, yellow, green, or blue color. If any contamients appear in any of the culture dishes, discard those cultures. When the dishes containing the choicest mycelia have been selected the mycelia can be transferred from the agar-based stock cultures to the liquid broth cultivation jars. These jars should have been prepared and sterilized three days before transferring and allowed to stand at room temperature during this time to test the effectivness of sterilization by observing if contaminates appear. Discard all broths which contain growths. The uncontaminated jars are now ready for inoculation. Spray the room and clean the work area as described under pure culture techniques. Also spray the outside parts of the stock dishes and culture jars. Lift the lid of a stock dish just enough and pick up a fragment of mycelium with an inoculation loop that has been flame sterilized and allowed a moment to cool. Lift the cover of the jar, place the mycelium fragment in the broth and cover the jar immediately. Repeat this until all jars have been inoculated. Refrigerate all unused stock cultures. Tighten the jar covers and shake well to disperse the inoculum throughout the broth. This also aerates the medium; the mycelium needs oxygen for life support and growth. Loosen the lids again and place the jars on the growing shelf for 10-12 days at 70-75 degrees F. If other species than Psilocybe cubensis are used, adjust the temperature accordingly. Every 2-3 days tighten the jar covers, shake to aerate and disperse mycelium, reloosen the covers, and return the jars to the shelf.

The process of growth can be followed with a saccharimeter. The maximum growth and highest percentage of psilocybin occurs about four days after all of the broth's sugar content has been used up. The mycelium should be harvested at this time. Any jars that cannot be harvested on that day should be refrigerated until this can be done.

HARVESTING AND DRYING

Filter the medium of each jar through a clean flannel cloth, collect the mycelial material from the cloth, and place it in a pyrex baking dish. Do the same with each jar of mycelium until each baking dish is about 1/3 full with mycelia. Dry these in an oven at no higher temperature than 200 deg F. Use an oven thermometer. Do not rely upon the temperature indications on the oven knob as these may vary from accuracy. Check the baking dishes periodically. When the material first appears to have dried shut off the heat and let the dishes stay in the oven until it has cooled. This ensures the evaporation of residual moisture. Each cultivation jar should yield 50–100 grams of wet mycelium. Fresh mycelium contains about 90 percent water, so this much would dry down to 5 to 10 grams of crumbly material. Each baking dish would contain a dozen or more mycelia.

EXTRACTION

Crumble and pulverize the dried mycelial material and combine each 100 mg of this material with 10 ml of methanol. Place the flask in a hot water bath for four hours. Filter the liquids with suction through a filter paper in a buchner funnel with Celite to prevent clogging. Collect and save the filtrate liquids. Heat the slurry (the mush in the filter paper) two more times in methanol as before, filter, and accumulate the liquids of the three extractions. To be certain that all of the alkaloids have been extracted do a small extraction with a portion of the used slurry and test with Keller's reagent (glacial acetic acid, ferrous chloride, and concentrated sulfuric acid). If there is a violet indication, alkaloids are still present and further extraction is in order.

In an open beaker evaporate the liquids to total dryness with a hot water bath or by applying a hair dryer. Be certain that all traces of methanol have been removed. The remaining residue should contain 25–50 percent psilocybin/psilocin mixture. Greater purification can be achieved, but would require other solvents and chromatography equipment and is hardly necessary.

Each 100 grams of dried mycelium should yield about 2 grams of extracted material. This should contain at least 500 mg of psilocybin/psilocin mixed or about fifty 10 mg doses. Theoretically psilocin should have the same effect upon the user as psilocybin. The only difference between the two is that the later has a phosphate bond which disappears immediately after assimilation in the body. In other words, in the body psilocybin turns into psilocin. Psilocybin is a fairly stable compound, but psilocin is very susceptible to oxidization. It is best to keep the extracted material in a dry air tight container under refrigeration. A sack of silica–gel can be placed in the container to capture any moisture that may enter.

DOSAGE

The standard dose of psilocybin or psilocin for a 150 lb person is a 6–20 mg dose. We will figure the average dose as 10 mg. The crude alkaloid extraction process given here yields a brownish crystalline powder that is at least 25 percent pure. Each mason jar should contain at least 50 grams of wet mycelium. After drying this would be about 5 grams of material. The crude material extracted from this should contain 25–30 mg of psilocybin/ psilocin or roughly 2–3 hits. This yield may very to some extent depending upon several factors. Many of these species contain less of these alkaloids than dose Psilocybe cubensis and the alkaloidal content of this species may very in different strains. Cultivation conditions have alot to do with yield too. Higher temperatures (75 degrees F.) cause more rapid growth but lesser psilocybin content than do lower temperatures (70 degrees F.) One must test each new batch of extracted material to determine the proper distribution of dosages. Depending on the potency of the mycelia and how well the extraction was conducted the dose may range between 25 and 100 mg. Also bear in mind that the dose varies for different individuals.

LARGE SCALE PRODUCTION

The techniques and procedures described in this guide can be employed to cultivate modest supplies of psilocybin for personal use, or they can be expanded to apply to the large scale production of many thousand doses per week. A small 10 x 15 foot room with standard 8 foot ceilings can be set up to produce an unending yield of at least 5000 doses per week. The stock culture shelves here are 1 foot deep and 5 feet long. Each could hold twenty 15 cm petri dishes. If shelving is spaced six inches apart, there can be as many as 16 shelves stacked in this space. This would allow for up to 300 stock culture dishes going at one time. The crop culture shelves can be stacked ten inches apart, accommodating one quart size mason jars and giving ten levels. With the dimensions of the room as mentioned this much shelving could hold about 2800 jars (3 deep and 3 per running foot). The entire room − walls, ceiling, and shelving − should be painted with a white, glossy kitchen enamel. This is not only an important sanitary measure, but also improves the efficiency and even distribution of light in the room.

Lighting should be provide by a few banks of wide spectrum fluorescent tubes fairly evenly distributed across the ceiling and turned on for 10−12 hours regularly each day. These are great dust catchers, however, and must be wiped clean periodically. The work table should also be painted with a hard smooth, white finish. If the table is metal, a small, clean cutting board must be provided on which to pin down mushroom caps when disecting them. Shelf boards on the wall next to the table may be extended above the table to provide space for storage of work equipment and ready containers. A hood should be constructed around the table to protect it from dust, etc. A fume hood with a flu vent and spark−free exhaust fan should be constructed over the extraction area to remove toxic and combustible methanol vapors.

Extraction is preferably conducted in another room. If the cultivation room is used for extraction while the cultures are growing, care must be taken that the heat from the extraction process does not alter the room temper−ature. The fume hood will help by carrying off most of the heat. A vinyl shower curtain should be hung around the work table to shield the area of breezes when anyone enters or exits the room. Another vinyl curtain can be hung just inside the entrance to serve as a dust trap. A person entering the room would close the door behind him before pulling the curtain aside − and vice versa on exiting. The floor should be white vinyl or asphalt tile or painted white and coated with verathane or polyurethane. There should be no cloth or carpeting in the room except for a supply of clean worl clothing and surgical masks. The only other items in the room would be a stool at the work table, a three step ladder for reaching the upper shelves, and a small table on rollers on which to place jars and dishes when making the rounds of the shelves.

Unless one has a large staff of assistants it would be impossible to inoculate 2800 jars in one work session. After getting used to the work one could do about 100 jars an hour. The best procedure is to set up a continuous rotation of inoculations. Working about three hours a day about 235 jars could be inoculated each session. All 2800 jars could be inoculated in 12 days. Sections of shelving would be divided into groups of 235 jars, and these sections would be labled with the date and approximate time of inoculation. The work schedule for cultivation would be as follows:

DAY	INOCULATE	SHAKE	HARVEST	REINOCULATE
Mon	Group A			
Tues	B			
Wed	C	Group A		
Thurs	D	B		
Fri	E	A and C		
Sat	F	B and D		
Sun	G	A, C, and E		
Mon	H	B, D, and F		
Tues	I	A, C, E, and G		
Wed	J	B, D, F, and H		
Thurs	K	A, C, E, G, and I		
Fri	L	B, D, F, H, and J		
Sat	Commence Reinoculation See Col. 5	C, E, G, I, and K	Group A	Group A−2
Sun		D, F, H, J, and L	B	B−2
Mon		E, G, I, K, and A−2	C	C−2
Tues		F, H, J, L, and B−2	D	D−2
etc.		etc.	etc.	etc.

This would represent the first 2 weeks of the continuous cultivation cycle. The continuation of this schedule is obvious: shaking every other day, harvesting approximately every 12 days, and resterilizing, refilling with fresh medium, autoclaving, and reinoculating the jars liberated by the days harvest. If the total number of jars is 2800, each group would consist of 235 jars. The same schedule could, of course, be adapted to any number of jars. Drying of the mycelia should be done within a few hours after harvesting. Otherwise enzymes in the material will begin to destroy the active alkaloids. Once dried the material can be stored in cool, dark, dry place until enough daily harvests have been accumulated to do an extraction. If the mycelia can not be dried right away it can be kept in a refrigerator for a day or two, or longer times in a freezer.

MAINTAINING A PERPETUAL PSILOCYBIN FARM

Fresh inoculum can come from stock culture dishes kept under refrigeration. If these should become depleted, healthy strains of mycelium from the crop cultures can be used to inoculate sterilized agar media in dishes. To do so shake the crop culture jar violently to break up the mycelium. Then transfer drops of the liquid into autoclaved petri dishes of unused agar medium with a sterilized pipette and let it grow as before. If this reinoculation of stock cultures from existing crops is continued over a long period of time, the strain will eventually weaken due to what is known as the senescence factor. To avoid this alternate the media used in the stock dishes. That is: if PDA is used the first time, use MEA the second time and PDA again the next time, etc.

RECOMMENDED READING

If you cannot find these books in a bookstore, they can be ordered by mail from their publishers:

HOMEGROWN HIGHS
M.J. Superweed, 1972.
High potency cultivation techniques for several psychoactive plants including peyote, San Pedro, coleus, and morning glory;
plus a special medium formula and practical method for maximum mcycelial growth and extra−high psilocybin yield. The formula can be used in combination with the large−scale production methods in our guide.
Send $1.50 plus .50 handling to: Flash Mail Order Post Express, 9926 Haldeman Ave, Suite 3B, Philadelphia, Pa. 19115

PSILOCYBIN − MAGIC MUSHROOM GROWERS GUIDE
O.T. Oss and O.N. Oeric, 1976.
Excellent guide for those who wish to cultivate carpophores of Stropharia Cubensis. Nicely illustrated with black and white and color photographs.
Send $4.95 plus .50 handling to: Flash Mail Order Post Express, 9926 Haldeman Ave, Suite 3B, Philadelphia, Pa. 19115.

Two other highly recommended books − **Keys to Genera of Higher Fungi** and **Poisonous and Hallucinogenic Mushrooms** are discussed earlier in this guide.