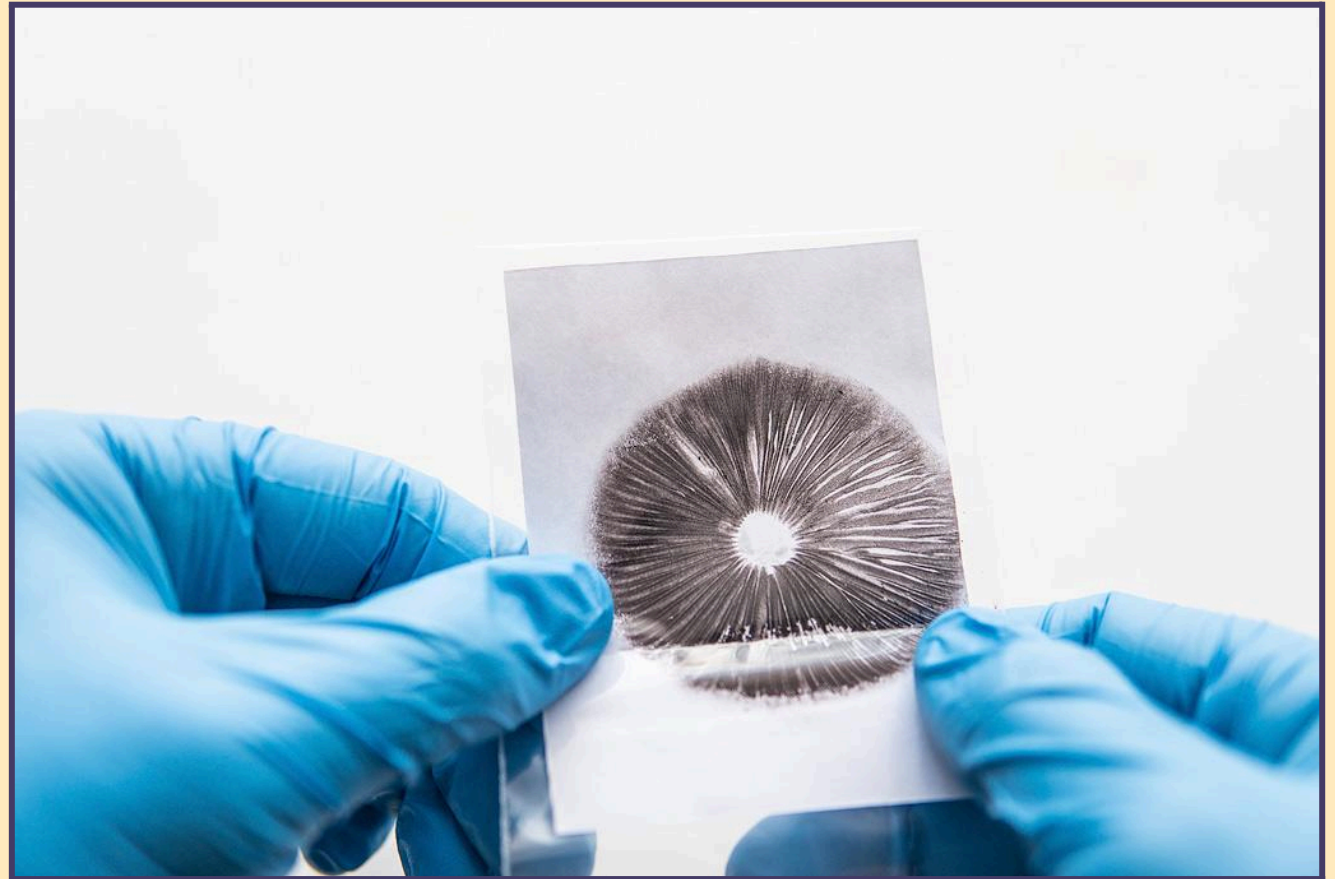


Cultivating Mushrooms from Spores & Liquid Culture

Psilocybe cubensis



**Dutch
Headshop**





Psilocybe cubensis

Psilocybe cubensis is an easy-to-grow species of mushrooms because the method is so standardized that anyone can grow mushrooms with these instructions. Some well-known cubensis varieties or strains include Golden Teacher, McKennaii, Ecuador, and B+. Follow this guide carefully, and you will be rewarded with a beautiful yield of homegrown mushrooms. Note that this Dutch-Headshop guide is only for the PF-Tek method of cultivating spores to liquid culture and from there to mushrooms. We start with a spore print.

Some known cubensis strains:

Mexican, Thai, Treasure Coast, Golden Teacher, McKennaii, Ecuador, Albino, B+, Hawaiian PES, Penis Envy, Mazatapec, Colombian, Cambodian.



Shopping List for Cultivating from Spore Print

- ✓ A spore print.
- ✓ A jar that can be sealed airtight, such as a preserving jar.
- ✓ Sterile gloves (latex, nitrile rubber, etc.).
- ✓ Cleaning alcohol and wipes.
- ✓ Lighter with a blue flame.
- ✓ Aluminum foil.
- ✓ Rubber bands.
- ✓ Agar agar powder.
- ✓ Dextrose, glucose syrup, honey, or malt extract.
- ✓ A large pot that fits the preserving jar.
- ✓ A knife.
- ✓ Sticky labels.

Optional and recommended:

- ✓ Petri dishes.
- ✓ Parafilm (a type of tape made of wax), so you don't need aluminum foil or rubber bands.
- ✓ Pressure cooker or autoclave instead of a regular pot.
- ✓ Scalpel instead of a knife.



1 Growing Mushrooms from a Spore Print

Spores are the 'seeds' of a mushroom.

If you have purchased a liquid culture syringe from Dutch-Headshop, you can skip this chapter.

Cleaning and Preparing

1. Make sure all necessary materials are within reach. Clean your workspace and disinfect it with alcohol. Wash your hands thoroughly with soap and water, then wear sterile gloves.

Agar Agar and Sterilization

2. Prepare the agar agar solution. You don't need much. If you don't have petri dishes, make enough to cover the bottom of the preserving jar. Heat the solution until the powder is completely dissolved.
3. Pour the warm agar solution into a preserving jar, filling it to about 1 cm deep, or pour a small layer into a petri dish. The agar will slowly solidify. Do not add more water.

4. Immediately close the jar or dish. Wrap aluminum foil tightly around the jar or dish and secure with rubber bands, or apply parafilm around the seal.
5. Put a layer of water in a large pot and bring it to a boil. Place the jar or petri dishes in the water and let it boil for an hour with a closed lid. The steam will sterilize the glass and contents. A pressure cooker works even better, boil for 45 minutes in that case.



Adding Spores

6. After boiling, let the materials cool so you don't burn your hands. Sterilize the work surface with alcohol again before taking items out of the pot.
7. Remove the aluminum foil or parafilm.
8. Hold a sharp instrument, such as a knife, needle, or scalpel, in a blue flame (gas stove or torch lighter) for about half a minute to sterilize it.
9. Open the spore print carefully over the clean workspace. Use the sterile instrument to apply a small amount of spores from the spore print to the surface of the solidified agar in the preserving jar or petri dish.
10. Close the jar or dish again and repackage the spore print. Note the date and contents on a label.



Incubating Spores

11. Place the preserving jar or petri dish with spores and agar in a dark place at a temperature of 24-27°C.
12. Regularly check the jar for signs of mycelium growth and possible contamination. It takes a few days for white threads to grow from the dark spots of the spores.

Why Use Petri Dishes First?

Contamination happens faster than you think. If you find contamination in a petri dish, you can discard the contents of that dish. That's why experienced growers always prepare more petri dishes to increase the chance of growing an uncontaminated white mycelium in one of the dishes.

Contamination?



Healthy mycelium



Bacteria



Other fungi

Dispose of your project and start again if you have contamination. Even if you work cleanly, this can happen. Dutch-Headshop Tips: Try to work as sterile as possible and prepare more petri dishes or jars than you need.



Making Liquid Culture

- 13.** When at least half of the agar is white from the mycelium, you can make liquid culture. Add sterile (boiled and cooled) water to the preserving jar with the grown mycelium until the jar is about three-quarters full. Add a teaspoon of dextrose, malt extract, honey, or glucose syrup to the jar. This provides extra nutrition for the fungus.
- 14.** Close the jar well and shake gently to distribute the mycelium evenly in the nutrient water.
- 15.** If you used petri dishes like the pros, you will first need to sterilize the preserving jar as described on the previous page. Open the dishes and transfer pieces of mycelium into the cooled preserving jar.
- 16.** Store the liquid culture at 18-20°C in a dark place for a few days to let the mycelium grow. Shake the jar daily to prevent clumping.





2 From Liquid Culture to Growing Kit with Brown Rice

If you bought a liquid culture syringe, start here. And if you are growing from a spore print, continue from the previous chapter here.

To grow mushrooms from liquid culture, the mycelium in the liquid culture needs to grow on something. This growth medium can be made from various things as long as it nourishes the mycelium and doesn't harm it. Various grains work well, such as brown rice, sorghum, oats, rye, or even hard popcorn. We found it easiest with brown rice because you can buy it in any supermarket.

The mycelium can be seen as the “roots” of a fungus, but only when the root system is large and strong enough can mushrooms grow. And that's what we will do in this chapter.

The PF-Tek Method

PF-Tek stands for “Psilocybe fanaticus technique” and was developed by Robert McPherson in 1991. We have made some adjustments to this method with new information.

Shopping List for Growing from Liquid Culture

- ✓ A syringe with liquid culture or, if you made your own liquid culture, a sterile empty syringe.
- ✓ Glass jars with a straight neck and matching lid. The more jars, the higher the chance of success.
- ✓ A large pot that fits the jar.
- ✓ A rack or stand to place the jars on in the pot and a sieve.
- ✓ Band-aids or microporous tape.
- ✓ Sterile gloves (latex, nitrile rubber, etc.).
- ✓ Cleaning alcohol and wipes.
- ✓ Lighter with a blue flame and perlite (porous white stone).
- ✓ Aluminum foil, rubber bands, and sticky labels.
- ✓ Brown rice, sorghum, oats, rye, popcorn... something for the mycelium to grow on.
- ✓ Plastic storage box with matching lid, at least 20 cm high.

Optional and recommended:

- ✓ Parafilm (a type of tape made of wax), so you don't need aluminum foil or rubber bands.
- ✓ Pressure cooker or autoclave instead of a regular pot.
- ✓ Teflon filter membrane with a mesh size of up to 4.0 µm.



Cleaning and Preparing

1. Make sure all necessary materials are within reach. Clean your workspace and disinfect it with alcohol. Wash your hands thoroughly with soap and water, then wear sterile gloves.

Cooking Rice

2. Fill a glass jar halfway with brown rice. You can do this with most grains, but we use brown rice in this step-by-step plan. The more jars you make, the higher the chance of success.
3. Remove the rice from the jar and put it in a pot with boiling water. Let it boil for 10 minutes. Drain and fill the jar with the cooked rice. The jar should now be three-quarters full due to the rice expanding. Leave a quarter air.

Sterilizing

4. Close the jar with the lid and wrap aluminium foil around the lid and the jar. Secure it with a rubber band.
5. Take a large pot that fits the jar(s), a pressure cooker, or, for the wealthy reader, an autoclave. Add a layer of water to the pot and place the jars on a rack in the pot, so they do not touch the bottom. This prevents burning.

6. Bring the water to a boil. Set a timer once the water is boiling. If using a regular pot: boil for 1.5 hours. If using a pressure cooker: 45 minutes. Do not let it dry out; add boiling water if it evaporates.



This is an autoclave, which can accommodate multiple jars. A large pot or pressure cooker that fits one jar will also suffice. You just need to boil longer.



Inoculating

7. Remove the jars from the pot and let them cool to room temperature.
8. Take the syringe out of the package and hold the tip in a blue flame for 30 seconds to disinfect it. Let it cool. For homemade liquid culture, fill the syringe with your liquid culture now.
9. It is important to work quickly now: open the jar with rice, but do not remove the lid completely. Leave a small gap. Inject a bit of liquid culture along the edges of the glass and close the lid again.





Mycelium Growth (Incubation)

- 10.** Make a small hole in the lid, for example, with a screwdriver. If doing so, first sterilize the screwdriver by holding the tip in a blue flame for 30 seconds. Immediately cover the hole with band-aids, microporous tape, or the best method: a Teflon membrane filter with a sticky edge. Choose a membrane with a mesh size of up to 4.0 μm . This prevents contamination but allows fresh air.
- 11.** Seal the lid with aluminium foil and a rubber band or use parafilm around to make everything airtight except the hole. Make a hole in the foil if using that.
- 12.** Write the contents and date on a label and stick it on the jar. Store the jars in a dark place at a temperature of 24-27°C.
- 13.** After a few days to a week, you should see white fungus if everything goes well. This is why it is handy to inject along the edges of the jar, so you can see it better. Shake the jars daily to distribute the fungus throughout the jar and speed up incubation. Always store in the dark.





3 From Growing Kit to Mushrooms

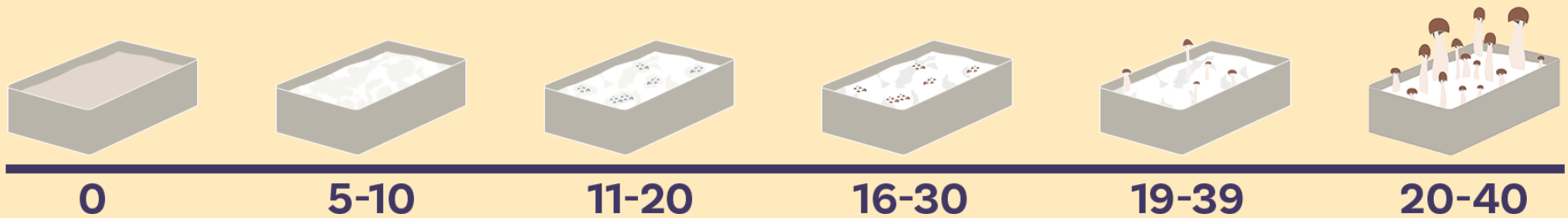
Forming Fruiting Bodies (Mushrooms)

1. Only when the entire contents of the jar are white can the fungus produce mushrooms. How long this takes depends on the size of the jar, how often you shake it, and the ambient temperature.
2. All rice white and moldy? Well done! Now comes the easiest part: growing mushrooms. Take a large, preferably transparent plastic storage box. IKEA has them, for example. Shoebox size is fine. The surface area doesn't matter much, but the height does. Ensure you have about 20 to 30 cm of space above the mushrooms when you place the jar with rice upright in that box. Clean the box with warm water and soap, dry it, and then wipe it down with a cloth and alcohol.
3. Lay a bottom layer of perlite in the box. This ensures no stagnant water surrounds your mushrooms.
4. Open the jar and turn the contents over into the box on a bed of perlite. Do not spread the contents! Retain the cylindrical shape of your moldy rice. Is your box too small and not enough room for growing mushrooms? Then lay the cylindrical shape down instead of upright.
5. Add a layer of boiled and cooled water to the box, but do not let it reach the perlite. Do not let it come into contact with your moldy rice.
6. Spray the lid of the box with boiled and cooled water using a plant sprayer or misting device.
7. Place the lid loosely on the box, leaving a gap on both sides of the box.
8. Now we have the humidity and fresh air under control. Store the box at room temperature. 21-25°C works best. As for light: mushrooms grow better upwards if they get a bit of light at the top, but direct sunlight is not good. Do not place on the windowsill; somewhere in the kitchen is often fine. Out of reach of children and pets.
9. It can take a week to three weeks before you see the first signs of growth. Ensure there is always condensation on the inside of the lid during cultivation. You will need to keep the environment moist with a sprayer or misting device regularly. Avoid spraying over the 'cake' directly when doing this.



Cultivation Progress

Depending on the mushroom strain and temperature, the first tiny white fungal balls (primordia) appear after 11-20 days. Do not worry if this does not happen yet. Patience is a virtue. Another 5-10 days later, the first pins form. These are the growth points from which the mushrooms will grow. From then, it can take another 4 to 10 days for the mushrooms to be ready for harvest, depending on the conditions. But be patient. **It can take 20 to 40 days in total** for your mushrooms to be ready.

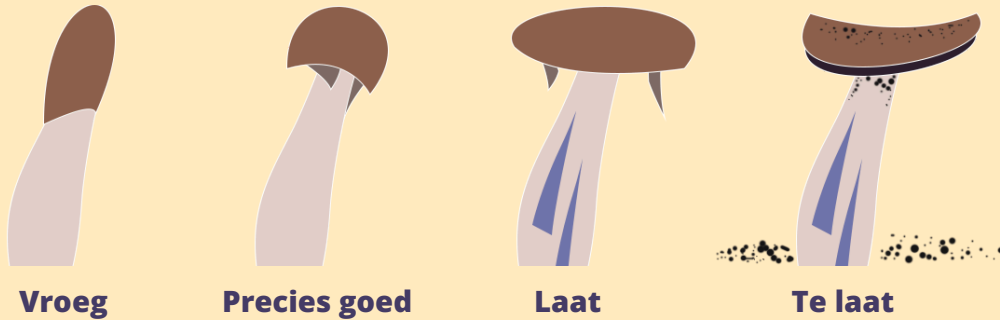




Drying Mushrooms

Fresh mushrooms are a whole meal. By drying them, they lose about 80-90% moisture but remain just as potent if dried correctly. Place the mushrooms on a few layers of kitchen paper in a deep dish (e.g., an oven dish). Ensure the mushrooms do not touch each other. Cover the dish with a dark cloth, ensuring the cloth does not touch the mushrooms. Dutch Headshop tip: do this by placing a cup in the middle of the dish. Ensure the dish is not completely sealed by folding a corner of the cloth over to create a small gap allowing the mushrooms to get enough air to dry.

Place the dish high up, e.g., on a kitchen cabinet, where pets and children cannot reach. Let the mushrooms dry for about 5 days. Turn them occasionally and replace the kitchen paper. The mushrooms are ready for use or storage when they are bone dry and feel papery. Mushrooms lose up to 90% moisture (and weight) but not strength during drying. Do not use heat while drying. The air temperature should not exceed 30°C.



Harvesting Mushrooms

Mushrooms are ready before the membrane under the cap starts to detach. Harvest everything on the day most mushrooms are ripe. Even if the mushrooms are large and the caps remain small. Do not wait until the cap begins to curl upwards. Then the mushrooms have already lost potency. So do not wait too long. Mushrooms ripe?

1. Wash your hands and forearms thoroughly again and preferably wear new sterile gloves and carefully remove the kit from the bag.
2. Loosen the mushrooms by taking the base of the mushroom between thumb and forefinger and twisting until the 'root' comes loose. Also, take out all underdeveloped mushrooms from the box.



One More Time!

Mushroom growing kits can be used multiple times in quick succession. You can also try this with the PF-Tek method described here. One harvest is called a flush. All flushes together are called the total harvest.

- 1.** Fill the box with boiled and cooled water after harvesting. The colder the water, the better, but no ice! Close the lid of the box. Wipe the outside of the box and the lid with a cloth and some alcohol to disinfect.
- 2.** Soak the box for 8 to 12 hours in the refrigerator at 2 to 8°C. This combination of water and cold is called a cold shock. It tells the fungus it is time to produce mushrooms again. Is the box bigger than your refrigerator? Then leave the box outside the refrigerator.
- 3.** After soaking for 8 to 12 hours, drain all the water. Be careful not to let the perlite slide out. Spray the lid with water and place it back on the box with a gap for fresh air.
- 4.** Repeat all these steps for each flush. You can get two to four flushes from one cake if you work cleanly and disciplined.



Troubleshooting

Weird spots on the cake? Is the yield disappointing?

Green, Black & Gray (1)

Most questions to Dutch Headshop are about green, gray, or black spots on the growing kit. This is a fungus that has become stronger than the mushrooms. It only occurs if you didn't work cleanly enough. If this fungus is small and appears only after two weeks, it is no problem. You can continue growing. If the fungus appears earlier, the mushrooms are likely to rot if they grow at all. You can still try, but you will likely have to discard the growing kit. This shows how important it is to work cleanly!

Dark Brown, Deep Purple, or Black Spots (2)

As long as the mushrooms have emerged, don't worry. These are probably just spores from the most mature mushrooms. The largest mushrooms spread them over the smaller ones and the cake. However, you should consider if it's time to harvest. Ideally, you should harvest all mushrooms from the growing kit before the cap detaches from the stem and spreads spores.

Red-Brown Spots or Slime (3)

The cake is probably infected with a bacterial infection if you see round brown spots on the cake or in the box. Ensure the temperature is not too high and work cleanly. If you see these spots, finish the cultivation and assess if the mushrooms look good. If the entire cake looks like this and/or the mushrooms look dirty or

slimy, you must discard them. Do not start again with the same growing kit.

White Fluff (4)

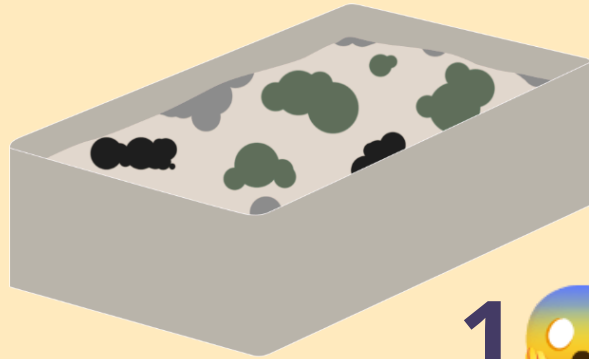
White fluff can appear at the base of the mushrooms and on the 'cake'. Good sign as long as it is truly white. This is the mycelium from which the mushrooms grow. Your mushrooms will become large and strong. If the fluff becomes very thick, moisture cannot evaporate well from the surface of the cake. You should make a larger gap between the lid and the box.

Blue Mushrooms (5)

Blue streaks on the mushrooms indicate the presence of psilocybin, one of the active compounds in mushrooms. Good sign. Mushrooms will become bluer as they age but will also lose some potency. The key is to harvest at the right moment - see the "Harvesting Mushrooms" section.

Low Yield (6)

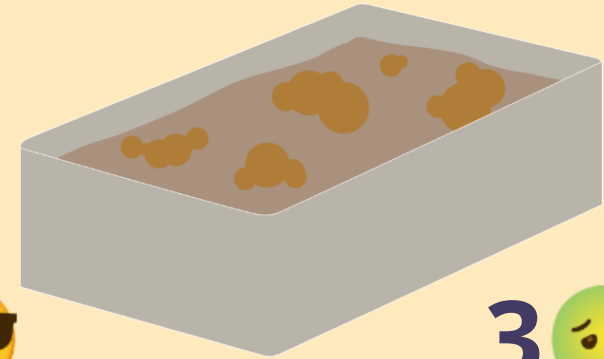
No small caps after four weeks, or only a few mushrooms? It could be that the growing kit did not start well. No worries. Harvest all mushrooms, including the small ones. Fill the box with cold water. Place the lid back and let the kit sit for 12 hours. Drain excess water and start again. You can do this multiple times if you work cleanly.



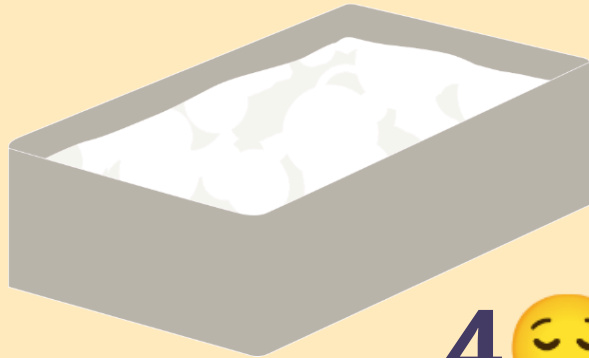
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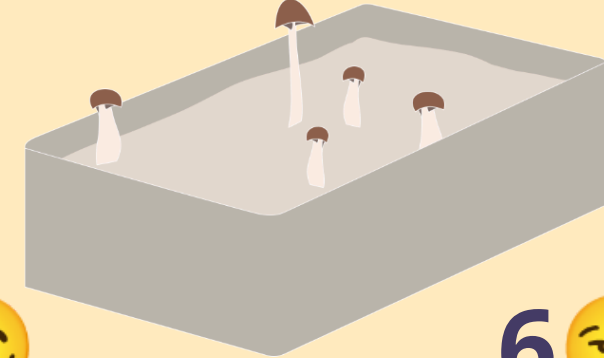
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1. Fungal contamination. Try growing.
4. Mycelium takes over. Refresh the air regularly.

2. No problem. These are spores.
5. Looks like psilocybin. Harvest.

3. Bacterial infection. Discard.
6. Can happen. Start a new flush!



Want to Know More?



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Read all about mushrooms, truffles, and other psychedelics here. All handy tips for growing, drying, storing, and using.