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Propagating Mushroom Spawn.

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I have received several requests about how to grow Mushrooms on coffee pulp when it is not possible to buy commercial spawn locally. All that is required is a source of local mushrooms which are recognized as being edible. This method only applies to 'exotic' mushrooms of the type that grow in the forest on dead trees. Those mushrooms that grow on compost and manure are no good for this system. Unless the local population can already buy fresh mushrooms in the local market, however small, seasonal and expensive is that supply, then establishing a commercial operation is sure to be a hazardous exercise. Check your market first. Neither should anyone go out into the forest and harvest anything they can find to use as a propagation agent. One has to rely on the local knowledge of the people selling in the market to guide oneself as to what is both safe and acceptable.

Developing ones own mushroom spawn without an autoclave or sterilizer is not the easiest of tasks but time and effort rather than temperature can make it possible. The problem is contamination with other common garden moulds or fungi which always seem to be more vigorous than the mushroom fungal growth that you want to encourage.

Fungal spores are very small, but some of them are very resistant and can stand the temperature of boiling water for up to an hour. So, all the preliminary clean up and preparation material should to be autoclaved at around 120oC, to kill off absolutely everything, and then carefully dissect out the start up mushroom mycelium very carefully so as not to contaminate it with more wild spores.

The old way around this was to boil the starting medium two or three days in succession. The first day triggers all the resting spore forms and starts them into their active growing phase. This makes them vulnerable to heat, and so the re-boil on the second day should kill them all off and leave a sterile medium. If it doesn't, then its reboil again for a third day. If a domestic pressure cooker is available then a two day operation will do the trick for sure. And, placing the brown rice or wheat grains up in the steam, rather than going soggy and slimy when totally submerged, makes life a lot easier.

Commercial spawn is usually sold in bottles with a mouth about 25mm in diameter that is plugged with a wad of cotton wool. However, old jam jars that still have their clean screw on lids are O.K. Tighten the lid and then backing it off about a quarter to a third of a turn will let the mushroom mycelium breathe O.K. Like growing inside a tree trunk, they don't need much air!

First of all boil up your collection of jars and lids for around half an hour, then when they are just cool enough to handle, with (clean) rubber gloves on, empty them out, put the lids on the jars and store them in a clean space. Wheat grains are the preferred medium but unpolished brown rice grains are a close second. Soak them overnight in cold water to get the moisture right, and then steam them in a sieve with the handle cut off, so that it can go inside the cooker and be held or propped up above the water level. One hour over boiling water in a saucepan or 15 minutes at full temperature in a pressure cooker should do the initial cook then using rubber gloves and a clean spoon or spatula, fill the jars with hot grains, leaving a small space on top. The next day, boil the filled jars with the lids slack and the tops just out of water. This is where the domestic pressure cooker comes into its own. Allow the jars to cool in the cooker, then tighten the lids as you take them out. This is your stock pile of spawn material.

Having bought fresh mushrooms in the market, make sure to get them with the stems or stipes still attached. You may have to place a special order and pay more to get them that way but the most active mycelium is in the stems, just where the stem attaches to the cap. The ultimate source however, is to ask the people to try and bring you some mushrooms with some of the wood that they grow out of still attached. That piece of wood is the best of all.

1/. Now, first the easy way. Fingers crossed that it will work for you. Open a sealed jar and drop in the top of a ripe mushroom with the gill side down, and put the lid on the jar. All of this spawn should be stored in the dark. There is no daylight in the middle of a tree.

If you are lucky, the spawn spores dripping out of the mushroom gills will inoculate the grains and you are "Away on a fast Camel!!!" What you look for is white fibres growing all through the grains. Once you see them starting out to grow, remove the mushroom and leave the clean white mycelium to continue growing until the jar is full. From then on, a few of those grains in a new bottle of fresh grains will keep it multiplying on virtually for ever. However, once you see a foreign growth of a different colour, then it's a case of throwing it all away and starting over again. Once a foreign mould has sporulated, even in a small corner of the jar it is virtually impossible to get rid of it.

2/. At the same time, a lot slower but a bit more positive is to use the white mycelium rather than the dark spores. First rinse one of the intact mushrooms, your rubber gloves and your sharp knife or scalpel in a 25% mix of home household chlorine bleach and water. Then rinse everything again with cold boiled water. Now split up the stem and take out several slivers of the central mass, which should be kind of fibrous, and gently push them down into the top of the jar and bury them, making sure that they are as closely in contact with the cooked grains as possible. Screw on the cap and store with 1/., in a warm dark place. As this is your main effort, do several jars to make sure that at least one will grow.

Alternatively;

3/. I have not tried it myself, but if 1 & 2 are not successful, this reference is one that uses the coconut water and gelatin that I mentioned to you last time. Agar is much better than gelatine but a lot harder to get.

www.ijat-rmutto.com/pdf/Nov_v5_n2_09/09-IJAT2009_61F.pdf Experiment first to get a strength of gelatine that will set when it is cooled out in the open, not in a frig. Then boil the mix and when it has nearly cooled put some in a jar and roll the jar around to coat all the inside. Then dissecting up the stem of a mushroom, or breaking up very small pieces of wood wet them with more mixture and put them in the jar, preferably lying on its side. If it is difficult to get a set with the gelatine then put the jar in the frig to set, then take out the jar and leave it in the open for an hour or so before adding the Wetted mushroom stem fibres. The extra gel around the jar will let the mycelium grow easily and a slice of the gelatin film should start you off on a fresh inoculation.

4/. Here is another one that looks pretty good using corrugated cardboard.
<http://www.waldeneffect.org/20090314mushroom/> The beauty of this is that soaking the cardboard in boiling hot water and then opening it out in half will give you a sterile surface without a pressure cooker or a three day boil up.

If you have a good internet connection then Uncle Google is the best friend you've got. "Mushroom propagation" and "wood loving" get you surely on the way!

Good luck and let me know how you get on.

Ken C.

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