

Preparing, Inoculating and Colonising Substrates

This document has been designed to use in conjunction with Section 5. Make sure you watch the lectures for closer details on the colonisation process.

Pasteurised substrate

Equipment you will need:

- Substrate. Choose from: straw (chopped is best but unchopped will work), straw pellets or paper pellets.
- Gypsum (calcium sulfate hydrate) powder - this is optional, but recommended.
- A sturdy mixing bucket/tub with a lid.
- A kettle (for hot water pasteurisation).
- Calcium Hydroxide powder (for cold water pasteurisation).
- A container to colonise substrate in and eventually fruit your mushrooms from. This can be a bucket with holes drilled in the side (12mm holes are great, around 10cm apart – smaller holes will work too) or any other food-grade hard plastic container you can put holes in. Yogurt pots, margarine pots and ice cream tubs all work well. Mushroom bags with filter patches are another option. You can also use carrier bags or bin bags with pin holes in for breathability.
- A large yoghurt pot for moving substrate – and perhaps another with the bottom cut off to help you move substrate cleanly.
- Micropore tape (if you are colonising in hard containers)

Method: Hot Water Pasteurisation (Recommended)



1. Add dry ingredients to your study mixing tub. If using gypsum powder, add 5% of the dry substrate weight and mix well. For example, for each 1kg of straw pellets I would add 50g of gypsum.
2. Add boiling water, stir well and close the tub. As a general rule, you should aim for 60% of your prepared substrate to be water. In some cases I have found a higher ratio works – up to 70%. We are aiming for field capacity here – see the lectures for more details on this. (If you are using straw, simply use enough water to cover the substrate. You will be draining your straw anyway).
3. Leave for a few hours, or long enough for the substrate to cool. Overnight is okay.

Method: Cold Water Pasteurisation- If you don't want to use boiling water

1. Add dry ingredients to your study mixing tub.
If using gypsum powder, add 5% of the weight of dry substrate and mix well. For example, for each 1kg of straw pellets I would add 50g of gypsum. Mix well while dry.
2. Add dry ingredients (including gypsum) to your mixing tub, with gypsum accounting for 5% of dry weight of the substrate. Mix well.
3. Pre-mix your water with calcium hydroxide powder. Add 1 teaspoon for every litre of water you use.
4. Stir into substrate well and leave with lid on for 12-24 hours.



Method: Mixing Pasteurised Substrate with Grain Spawn

1. When the substrate is ready, check for that the substrate is at field capacity. Grab a handful (with clean hands) and squeeze. It should feel 'sweaty' and when you squeeze hard you should get a few droplets of water coming from the substrate. If needed, add more water.
* If you are using straw, simply drain your straw well before the next step.
2. Starting with the substrate, make a 'lasagne' in your container, layering up substrate and grain spawn until you have filled the container. Add around 10% of the dry substrate weight in grain spawn – a little more if you have it, as this will speed up the colonisation process.
* An alternative to the 'lasagne' method - you can mix grain spawn evenly in with your pre-made substrate, then pour it directly into your container.
3. If using a bag, seal with a plastic clip or peg. If using a hard container, replace the lid and cover any fruiting holes with micropore tape.
4. Leave to colonise at room temperature for around 2 weeks.



Sterilised Substrate

Equipment you will need:



- Substrate. You will need hardwood sawdust of some kind. I use pellets but you could get sawdust from a tree surgeon, or buy hardwood sawdust firewood briquettes which will come apart in hot water. Whatever you use, make sure it's hardwood and not mixed with softwood. You will also need something nutritious to supplement your sawdust and aid colonisation. I use 50%

soya hulls for every 50% hardwood pellets. Many other growers supplement their sawdust with 10-20% wheat or oat bran.

- Autoclavable Mushroom Bags with filter patches. You can find these online. Try to get Unicorn Bags if you can.
- A kettle
- A good sized pressure cooker/canner – ideally one which reaches 15 PSI in pressure. I can recommend the Presto 23 Quart Pressure Canner which I bought on eBay and imported from America. If you cannot get a pressure cooker with this level of pressure, add 30 minutes to your sterilising time.
- A way to seal your bags. I picked up some PP5 plastic clips from my local budget store. Make sure you use PP5 plastic inside a pressure cooker otherwise it may melt!
- 70% isopropyl alcohol in a spray bottle.
- A still air box (SAB). This is optional but highly recommended as you will need to be as clean as possible to avoid contamination.



Method: Preparing Hardwood Bags for Sterilisation

1. Mix your dry ingredients (hardwood and soya hulls/oat or wheat bran) in your mushroom bag.
2. Add boiling water and mix well to break up the hardwood, and stir well. I use 600g hardwood pellets, 600g soya hulls and 2,100ml water.
3. Leave to cool and then check for field capacity (see lectures in Section 5).

4. Squeeze all air out of the bag and pressure cook it for 120 minutes at 15 PSI. Add half an hour to the cooking time if your cooker doesn't get to 15 PSI pressure.
5. Leave the pressure cooker to cool overnight before inoculating your substrate.

Method: Mixing Sterilised Substrate with Grain Spawn



IMPORTANT – you must be very careful when using sterilised substrate not to let it come into contact with potential contamination. That means avoiding exposure to open air when possible. I recommend doing this process inside a still air box to minimise the chance of contamination.

1. Clean your workspace well by spraying with isopropyl alcohol. Spray the substrate bag and grain spawn bag or jar, as well as your own hands and arms.
2. Break up your grain spawn inside its container.
3. Remove the fastenings from your substrate bag and grain spawn bag or jar, and swiftly but smoothly put the tops of the containers together – so as to avoid the inside of either coming into contact with the air.
4. Pour your desired amount of grain spawn (around 10% of the dry weight of your substrate) into your mushroom bag and clamp the top shut before removing the grain spawn container. Put the fastening back on your mushroom bag.
5. Shake the bag well to mix the grain spawn into the substrate as evenly as possible. Try not to touch the filter patch with your hands, and try to minimise the substrate coming into too much contact with it too.
6. Leave to colonise at room temperature for 2-3 weeks.