

Sterilising rye substrate for grain spawn
(Level 2 - advanced cultivator)

In mushroom cultivation cereal substrate is being used to produce grain spawn. This production stage is mainly used to expand the mycelium mass that you get from the agar- for the inoculation of fruiting substrates.

Recommended equipment:

Rye grain
Vermiculite medium
Gypsum
Autoclave bags Unicorn type 3 T or
Scale
Bag sealer or strong adhesive tape
Sieve
Container for mixing
Pressure cooker



Preparing the substrate

Soak the rye in 167°F/ 75°C warm water, allow the water level to be 4 – 5 cm higher and leave it in the tub overnight (12 - 18 hours). Put the soaked rye grain into a sieve and let it drain for about 15 minutes, then put it into the mixing container. Moisturise the Vermiculite using the sieve, until entirely soggy, watch out not to soak it too much. Make sure that the Vermiculite is evenly wet, but not as wet that water runs out of the sieve. Let it drain for 15 minutes. Now mix the gypsum equally with the rye grain, then add the Vermiculite and mix it again very well.



Mixing proportion

For one Unicorn bag Type 3 TL use 1,45 kg rye grain, 1,8 L Vermiculite medium and 9 g gypsum. This formula will result in 3 kg rye grain substrate. Time needed to sterilise: 3 – 4 hours.



Filling bags with substrate

Roll down the autoclave bag about 10 cm and pour in 2.7 kg of the grain substrate mixture. Be careful not to spill any substrate on the upper regions of the bag (in case you did, clean the bag with a wet piece of cloth). Then wrap the bag twice.



Sterilising the substrate

A pressure cooker is used for the sterilising process. Overlying a 2-3 centimetre water level at the bottom of the cooker, a separating insert keeps the bags above the water line. Assure yourself that there is no contact between water and the bags, decant some water if necessary (mind the operating instructions of your pressure cooker!). Now load the bags.

If the cooker is big enough you can make two levels of bags. Place the upper layer on a separating tray between the levels. This ensures that the steam gets evenly distributed.

Get the lid locked and put the cooker on a hotplate and start the heating. Wait until you can see steam leaking out, then close the outlet. Count the sterilisation time from the moment the pressure gauge reaches its highest

stage (for household pressure cookers). If you've got a professional pressure steriliser at your disposal sterilise at 121°C/ 250°F/ 15 psi/ 1.05 bar.

Once the sterilisation time has passed, the cooker must cool down in a clean place, preferably in front of a HEPA-filter (sterile air flow). If working without laminar flow hood put a clean piece of cloth/paper, soaked with 70 % alcohol or a 10 % chlorine solution over the cooker's outlet during the cooling process to filter the air streaming into the pot while pressure equalization

After the cooker is fully depressurised, open the lid. The bags should cool down to room temperature in front of a HEPA-filter or in a Glove Box.

As soon as the substrate has cooled down below 30°C/86°F, it is ready for inoculation. If you want to continue at a later date close the bags tightly, store the substrates in the refrigerator (35.6-39.2°F, 2-4°C) and use them within 4 weeks.

References:

„Mycelium running/ How mushrooms can help save the world“, Paul Stamets; Ten Speed Press, Berkeley/Toronto;

„The Mushroom Cultivator: A Practical Guide to Growing Mushrooms at Home“, Paul Stamets, Agarikon Press; First Edition (December 1983);

„Growing Gourmet and Medicinal Mushrooms“, Paul Stamets, Ten Speed Press, Berkeley/Toronto;