

# Growing MushroomBox™ Portabella Mushrooms.

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plus a source of growing instructions, downloads and mushroom-growing links*

MushroomBox™ Portabella mushroom spawn is a commercial strain producing large mushrooms (up to 8" in diameter) and high yields. Both the yield and size will be related to the quality of the mushroom compost used and the growing conditions, but it is also determined by the amount of CO2 present during the 'pinning' stage (formation of baby mushrooms or 'primordia'). If CO2 levels are relatively high, very few pins will be produced, and if the CO2 levels are decreased during the fruiting stage, then a small number of extremely large mushrooms may be produced (although yields will be lower).

Portabella, like button mushrooms, is unlike most of the mushroom spawn that we sell, in that it is a secondary decomposer. This means that it needs to work with other bacteria which carry out the primary decomposition of cellulose material into a form accessible by the portabella. All mushroom growing substrate (often referred to as 'compost', but quite different from garden compost or garden soil) is highly critical to successful outcome. Unlike plants, which derive their energy from sunlight, mushrooms derive all of their energy from the substrate that they are growing in. If the substrate is fully decomposed, then the mushrooms are unable to grow. Therefore it is necessary to produce a compost in exactly the right stage of decomposition ie partially broken down. Failure to grow portabella is almost exclusively due to failure to provide the right compost. With the right compost, Portabella is remarkably easy to grow.

*NB Do NOT buy mushroom compost from garden centres to grow these mushrooms on – garden centres sell the spent compost from mushroom growers*

## Stages of Growing Portabella Mushrooms

- 1) Prepare Compost (This can take three weeks or more, depending on conditions, if the ideal substrate isn't available)
- 2) Pasteurisation of the Compost
- 3) Spawning the Compost
- 4) Spawn 'run' (where the mushroom mycelium grows through the compost)
- 5) Fruiting (The mushrooms fruit in flushes, and up to 6 flushes are possible).

## Preparation of the Compost.

A variety of substrates may be used. However, the mushroom-growers' favorite is Horse Manure mixed with straw. ***The ideal compost is the bedding cleared out of horse-stables, which has been left to rot for around 3 weeks. If you can get this type of compost, simply move on to the 'pasteurisation step'.*** Check that there is no smell of ammonia. If there is leave it a little longer. Turning the compost every few days is ideal – allowing more oxygen to enter and the substrate to break down better.

If you contact your local riding stables, you will probably find that they have more horse manure than they know what to do with, and with new anti-pollution legislation, they will be glad to get rid of it. Some stables sell the manure, but be assured that they still have way too much of it. If you provide your own bins/bags, and do the shovelling yourself, you can normally persuade them to part with it for nothing.

If you are using plain horse manure without any bedding, you should add some straw to the material. A typical, simple recipe might be as follows:

50% straw  
50% fresh horse manure  
a small amount of gypsum (plaster)

Soak the straw thoroughly in water. Ideally submerge it in a tank of water (or river/lake etc) for two to three days. This will wet the straw thoroughly, but also, it will start a fermentation process which is very beneficial to the resultant mushroom compost.

Prepare the compost in a sheltered area, with a hard floor (not an earth floor, otherwise worms will be attracted to it) by spreading a layer of straw about 150mm high and about 1.5m x 1.5m area. Then sprinkle a generous handful of gypsum over this and add a similar layer of manure. Repeat until you have created a mound approximately 1.5-2m high. This will consume around two bales of straw. Cover the pile with a sheet of polythene, or tarpaulin to avoid drying out, and leave for about two days. The pile should start to heat up. After two days, you will need to turn the compost to prevent it from becoming anaerobic. Loosen the compost up, too, as it will begin to sink. Repeat again at two day intervals, until the compost stops heating. The compost is ready to move into the mushroom beds at this stage. The heating should reach 70C, which will pasteurise the compost and prevent the growth of competitor micro-organisms.

#### Pasteurisation

If the compost has been prepared as above, and heats to 70C, then your compost will be ready to spawn as soon as it has cooled.

However, if you wish to prepare small quantities of compost, it may not heat up readily, and may take a longer time to decompose. In this case, the compost will not have heated sufficiently to pasteurise, so you will need to heat it yourself to achieve this. It also kills off insects which may be present in the compost, who may feast on the mushroom spawn and prevent it from growing. If you have obtained rotted manure/bedding from Horse Stables, and you are not sure whether it is pasteurised, you can either take a risk and see if it works, or you can pasteurise to play safe.

The best way of pasteurisation is with steam. For example, you could use an old pressure cooker – place some water in the bottom of the pressure cooker, and fill the inner trays with compost. Heat it until the water starts to boil. The steam will pasteurise the compost. Ideally it should be heated for ½ hour or more, but we have found that even 15minutes is normally sufficient. For larger quantities, a pasteurisation unit can easily be created out of a 205 litre oil drum or a 20litre vegetable oil drum. In all cases, make sure that the mushroom compost isn't burnt by touching hot walls of the container, and that the water isn't all boiled away.

#### Cooling and Spawning.

Leave the compost to cool. Remember that even if the outside of the compost feels cool, the inside may well be 40-50C. If the spawn is added to the compost when the temperature is above 30C, it will be killed, so make absolutely sure (leave overnight) that it is cooled to ambient temperature.

The compost should be saturated with water but not enough that it drips out if a handful is picked up. If you squeeze the compost in your hand it should retain its shape, and it should be possible to squeeze water out of the compost.



*Initial stages of growth*

Place the mushroom compost in the growing containers. Growing containers can be plastic biscuit tins, polystyrene packaging boxes, polythene bags, cardboard boxes, wooden boxes etc. The container needs to be cleaned thoroughly with soap and water, and the soap thoroughly rinsed off before use.

Ideally, the compost should be 150mm to 300mm deep, but leave enough space to add 35mm of peat (or garden compost) at the top. Add the spawn to the compost (approximately 1.5-3% by DRY WEIGHT) – so 60g of MushroomBox™ Spawn will seed up to 4kg of compost. Ensure that the compost is all under 30C (failure to ensure compost is adequately cooled is a common cause of failure), and mix the spawn thoroughly. Higher spawn rates (3%) guarantee faster growth and less opportunity for infection by competing microorganisms.

Next, you need to create a high-CO<sub>2</sub> environment for the mushrooms to grow. This is done by covering or enclosing the compost in polythene. This encourages the spawn to run through the compost. Place this somewhere dark (although this isn't essential) and at warm room temperature (20-26C) BUT NOT ABOVE 30C!! After a few days, you will see thread-like growths coming from the spawn, and after a few more, the compost should look like it is covered in cobwebs, or mouldy. This is the mushroom spawn growing. Depending on temperature, compost and general conditions, this will normally take 11-21 days. In poor conditions (eg if the mushrooms are planted outdoors in cold weather), the spawn run may take several months. Often the mushrooms will surprise you many weeks or months later, when you thought things had gone wrong.



*Compost ready for 'Casing'*

### Fruiting

When the spawn run has completed (don't rush this stage, or you'll get fewer mushrooms), you need to increase air circulation, which reduces the CO<sub>2</sub> level and stimulates fruiting. Remove any bags/covers and spread 35mm of peat (or peat-based garden compost). This is called 'casing' and for reasons not entirely understood, it stimulates Portabella fruiting. The compost needs to be fresh from the bag, so that it is uncontaminated. The temperature should be dropped slightly (to 16-20C) and air circulation should be increased (ie remove any coverings from the compost). Evaporation will increase, so use a plant sprayer to keep the surface of the compost damp (but NOT wet) by spraying twice a day.



*Adding 35mm 'casing' on top of the mushroom compost*



*Pins appearing at the surface*

After 7-10 days, you should see brown dots appearing on the surface of the compost. These are baby mushrooms ('pins'), some of which will develop into mushrooms. Try not to spray these pins directly, as direct contact with droplets of water can cause them to abort. It may help to loosely cover the container with some polythene or damp newspaper to reduce evaporation, but it will be necessary to manually remove this twice a day to allow air exchange, otherwise build-up of CO<sub>2</sub> will prevent effective fruiting.

After the first flush, the compost will rest for 7-10days, and it should provide a second flush. You should get at least four flushes, and sometimes up to six, but each flush will get successively weaker. When no more mushrooms will grow, you can use the spent compost as a valuable mulch/soil conditioner. Sometimes you'll even get a few mushrooms grow after it is spread on the garden, particularly if it is spread in a damp, organic-rich part of the garden.



*Mushrooms appearing in a greenhouse border 6weeks after spawning*

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