Practical training for white button mushroom

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Introduction

The white button mushroom (*Agaricus bisporus*) is one of the most commonly and widely consumed mushrooms in the world. *A. bisporus* is now cultivated in at least 70 countries around the world, and global production in the early 1990s was reported to be over 1.5 billion kg, worth over US$ 2 billion. While the white button mushroom retains the highest overall consumption worldwide, it is one of edible mushrooms cultivated globally. Large-scale white button mushroom production is centered in Europe (mainly the western part), North America (USA, Canada), and S.E. Asia (China, Korea, Indonesia, Taiwan, and India). The estimated national annual production of mushrooms is approximately 50,000 tons with button mushrooms comprising 85 percent of this production. Button mushroom farming is a complex business, which requires technical skills. The major process of mushroom production involves the following steps:

I. Spawn production
II. Compost preparation
III. Spawning
IV. Spawn running
V. Casing
VI. Scratching
VII. Fruiting
VIII. Harvesting

This practicum provides practical training about spawning, casing, and scratching in mushroom cultivation. The following sections provide detailed information from step III spawning to step VIII harvesting.

Spawning

The process of mixing spawn with compost is called spawning. Before spawning, the mushroom spawn should be checked for quality without contamination. Mushroom spawn can be preserved at 4℃, but it should be taken out from refrigerator to restore its vigor under room temperature one day before it is used as inoculum or as a planting spawn. Vigorous growth of the planting spawn is a prerequisite to good growth and high yield. Old spawn is not acceptable because of possible decreased vigor and leads to low yield consequently.

The method followed for spawning is given below:

Layer Spawning:

Evenly mix 3–4 layers of spawn with the prepared compost. Cover the top portion with the whole mass of compost at the rate of 5 ml / kg.

Spawn running

After the spawning process, fill the compost in trays (plastic or wooden trays accommodating 15–20 kg compost) / shelves covered with a newspaper sheet or polythene. Spawn running is the phase during which mycelium grows from the spawn and permeates into the substrate and the time from spawn to colonization takes about two weeks. Maintain the temperature in the cropping room at 24 ± 2℃ and maintain the compost temperature for the spawn running phase no higher than 27℃. A higher temperature is detrimental for mycelial growth. Relative humidity should be around 90% and a higher CO_2 concentration (>3000ppm) is beneficial for spawn running.

Casing

While the compost beds are complete grown through by mycelium, cover the beds' surface with a layer of soil (casing) about 2.5 cm thick

to induce fruiting. Casing material characteristics include high porosity, water-holding capacity, disinfected, and a pH should range between 7–7.5. Although peat moss is considered the best casing material, it is not popular in Taiwan. The price of peat moss is expensive, so most farmers favor using lateritic soil for mushroom casing.

The casing soil before application should be pasteurized at 66–70℃ for 7–8 hours, treated with 2% formaldehyde, or sterilized with steam. The treatment needs to be done at least 15 days before the material is used for casing. After the casing is finished, maintain the room temperature again at 23–27℃, keeping the compost temperature no higher than 27℃ and relative humidity at 90–95%.

Scratching

When 70–80% of the casing layer surface is covered with mushroom mycelium, it is time for scratching. Before scratching, the casing layer should be heavily wetted. The scratching is done from the casing surfaces down to the compost interfaces with an iron-toothed rake. After scratching, maintain high relative humidity and CO_2 concentration in the mushroom house for mycelial fragment regrowth, and do not introduce fresh air or spread water onto casing surfaces.

Fruiting

Three days after scratching and heavily wetting the casing layer, fresh air can be introduced to cropping room and start re-circulating air. Under favorable environmental conditions viz. temperature (initially 24 ± 2℃ for about a week and then 16 ± 2℃), moisture (2–3 light sprays per day for moistening the casing layer), humidity (above 85%), proper ventilation and CO_2 concentration (900–1200 ppm), the fruit body initials which appear in the form of pin heads start growing and gradually develop into the button stage.

Harvesting

Mushroom caps at the button stage measuring 2.5 to 4 cm across and closed, are ideal for harvesting. The first crop appears about three weeks (20–25 days) after casing. Mushrooms need to be harvested by

light twisting without disturbing the casing soil. Once the harvesting is complete, gaps in the beds should be filled with fresh sterilized casing material and then watered. In Taiwan, about 15–20 kg fresh mushrooms per 100 kg fresh compost can be obtained in a two-month crop.