



Change your Fortune by Growing Button Mushroom

The four popular exotic mushroom species currently grown and consumed in Kenya are Button *Agaricus bisporus*, the Oyster *Pleurotus* spp, Shiitake *Lentinula edodes* and Reishi *Ganoderma lucidum*.

Out of the four, Oyster mushrooms are the easiest to cultivate, growing in a wide range of substrates and temperature conditions. They grow in temperatures ranging from 15°C – 32°C hence they are referred to as “mushrooms for

all seasons”. They are the easiest mushrooms to grow and hence the most commonly grown.

Button Mushroom has the highest demand with Kenya importing up to 80,000 tonnes to satisfy its tourist industry. Due to its complicated growing process many farmers shun its cultivating but with the knowhow this is a very fortunate venture.

Commercial cultivation of Button mushroom began in France in the seventeenth century and then spread to other parts of the world. It is now the most popular cultivated mushroom species, being grown in more than 70 countries. It accounts for 38% of the world production of cultivated mushrooms.

The mushroom is tiny (5-10cm), with a hemispherical shaped cap and white flesh. Lately, brown strains have been developed being marketed as crimini or portabella mushrooms. The latter are sold in mature form which have opened and flattened caps. The stipe of *Agaricus* is cylindrical in shape 1-2 cm wide and 6cm tall and has a ring (annulus). There are many wild poisonous species which can be mistaken for *Agaricus*.

Preparation of substrate for Button mushroom follows a complex two-stage process involving composting followed by pasteurization. The bulk substrate materials used are wheat straw, chicken and horse manure (some farms use urea instead) supplemented

with cotton seed cake and molasses. Thorough mixing of these is achieved manually or by use of a tractor in some large scale farms.

The straw is used whole and put in a pile for mixing purposes and aeration. The process starts with pre-wetting the straw for 5-6 days. If urea is used, it is added on the 3rd day of turning. Chicken manure is added on the 4th day of turning and horse manure on the 6th day. Cotton seed cake and molasses are added on the 7th day of turning. On the 9th day, the straw is piled in a block of 1.5m wide and 1.5m high. In this state, the temperatures are allowed to rise which encourages



Mixing substrate manually at a farmers farm in Karen, Nairobi.

thermophilic organisms (thermopiles) that break the straw to flourish. The process of composting (1st phase) takes 15- 21 days.

After this, the compost is ready for pasteurization at 60°C in a special built chamber (a tunnel). The tunnel is a purpose built highly insulated structure where the compost is placed in a heap of 1-2 meters for pasteurization.

Air is first blown into the tunnel using a motor to expel excess ammonia. Pasteurization is achieved by passing steam into the tunnel from oil drums at 60°C for 8 hours. The temperature is kept constant and is monitored by thermometers placed strategically on holes made through the walls of the tunnel.

The purpose is to kill pathogens, pests (plus their eggs and larvae) and weed moulds. Pasteurization or peak heating is followed by conditioning where more of the ammonia is expelled

and temperatures are gradually reduced to room temperatures (23-27°C). During this time, Actinomycetes (microscopic organisms which cause white fungal spots on the compost) develop. They do not inhibit the mycelial growth of mushrooms. Conditioning takes one or two days after which the compost is ready for spawning.

After spawning, the bags should be incubated at 25°C - 27°C which is the optimal temperature for mycelial growth.

Fully grown compost is fully colonized with mycelium, giving it a white or grey colour. It is however not yet ready to produce a good crop of mushroom. It requires a casing layer which provides the right bacteria and the right amount of water that stimulate

the mycelium to form a good crop. Watering directly on the compost would cause rot and consequently no mushroom would develop. The casing material also acts as a buffer. Most farmers in Kenya use pasteurized virgin forest soil as casing material.

Ruffling is the procedure of lightly raking the casing soil to get a more uniform mycelial growth. The ruffling procedure breaks the mycelium in the casing soil layer, stimulating regrowth and soon a fluffy white appearance is observed on the layer.

When pin heads are observed, conditions are changed in the room to initiate fruiting. Using air ventilation, compost temperature is reduced with about 5-6°C to approximately 20°C within a few days. Since the pin heads are very sensitive to dehydration, irrigation is important. Spraying water using a humidifier provides the needed water and maintains the humidity at 95% and also helps to lower the temperatures of the compost to the desired range. Opening windows and doors ventilates

the room and soon pinheads develop into buttons. The drop in temperature and introduction of oxygen and reduction of Carbon dioxide by increased ventilation changes the mycelium from vegetative to reproductive stage and fruiting is initiated.

Harvesting is expected three weeks after casing. It is achieved by hand picking and takes weeks depending on the growers schedule and quality of the compost. Some farmers recase the bags to prolong this period. The most economical harvesting period takes 6 weeks. Picking mushrooms is done with clean hands, with a light rotating movement, taking care not to bruise the caps. Mushrooms must not be watered before picking as water reduces the shelf life. Water as soon as harvesting takes place. Farmers are cautioned to use clean water for watering to avoid contaminating the mushrooms.

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Button mushroom gallery Photos courtesy APEMTC