Growing Shiitake Mushrooms On Sawdust Blocks

An Overview

Spawn is used to start Shiitake mushroom growth on sawdust blocks. Spawn used for blocks is normally grain spawn, sawdust spawn or liquid spawn with Shiitake actively growing on it. There are several different strains of Shiitake spawn to meet a variety of farmer and market needs. The strain characteristics are also influenced by the substrate formulation.

Below are some characteristics to be considered when ordering spawn from a commercial supplier to produce sawdust substrate blocks:

- Size, shape and color of mushrooms
- Speed of incubation
- Temperature range for incubation and crops
- Resistance to disease
- Speed of cropping
- The effect of transportation on the active spawn

Production

High volume, space efficiencies and economies of scale are strengths of this method of Shiitake mushroom production. A good amount of Shiitake production experience is required in order to control expenses and maximize profits. Production of Shiitake mushrooms on sawdust blocks is the method used by most commercial growers in the United States. Since production occurs in an environmentally controlled space, the quality and quantity can be managed to meet market demands. The following is a brief description of this production process:

Substrate Mixing

- Sawdust should be course (approximately 1/8 inch). Sweet gum or Oak trees
- Supplements of grains and ban are added to speed growth and increase yields
- One common formula is 70% sawdust and 30% supplement
Substrate Sterilization

• Substrate is bagged in heat resistant plastic bags, normally 5-6 each.
• Bagged substrate is heated from 212-250 degrees °F (Fahrenheit) to eliminate or reduce competing organisms.
• The substrate is heated for 2-12 hours, depending on temperature and total volume of substrate in the heated chamber.

Inoculation

• The substrate must be cooled to 86% degrees F or below before inoculation.
• After the closed bags are removed from the heat chamber, they are placed in sterile air
• Bags are opened in front of sterile airflow
• Between 1/8-1/4 cup of grain spawn is added to the substrate in front of a sterile airflow
• The bag is then heat-sealed in front of a sterile airflow
• The spawn is spread through the substrate by shaking the bag

Incubation

• Incubation is the process that occurs when the Shiitake mycelium moves through the bag and begins to consume the sawdust substrate
• The optimum temperature for vegetative growth stage is 72-77 degrees °F
• Light is required
• The length of incubation depends on the substrate formulation and will require from 30-120 days

Cropping

• During incubation, the Shiitake Mycelium binds the sawdust substrate into a firm block, so the bag can be removed
• The temperature of the cropping room will vary from 50-77 degrees °F, depending on the crop stage, strain and substrate formulation
• Water, temperature, humidity & oxygen are controlled and varied during each cropping cycle
• The cropping cycle includes induction, pinning, fruiting and resting
• Biological efficiencies can be managed from 40% to 90%
• Each cropping cycle will require 20-64 days, depending on substrate formulation and management practices
• The total number of crops produced on each block depends on size and formulation and can vary from one to six

Harvest

• The mushrooms are picked after they have opened but are not fully expanded about 70% open
• Store in a cooler at a 34-36 degrees °F and at 85-95% relative humidity
• The United States market is for fresh Shiitake; however, drying can preserve overproduction and discards

Equipment

Equipment will vary greatly, depending on business decisions made by the farmer. Some of the considerations are volume and speed of production, capital investment, available labor and whether to manufacture or purchase the substrate blocks. For example, if the decision is made to purchase cured blocks, only cropping equipment is required. The following list of equipment is a very general description of equipment that may be required.
**Substrate Mixing**

- Ribbon Mixer
- Scales

**Substrate sterilization**

- Heat-resistant bags with filter for gas exchange.
- Pressure vessel for 15 pounds of pressure and 250 degrees °F or unpressurized vessel for steam at 212 degrees °F.
- Boiler or steam generator

**Inoculation Requirements**

- Clean room
- Laminar flow hood with HEPA filter
- Bench top heat-sealer for bags
- Inoculation rooms with temperature controls
- Substrate bag racks

**Cropping**

- Cropping room
- Block racks
- Temperature controls
- Humidity controls
- Air exchange controls
- Lighting controls
- Carbon dioxide measurement instrument
- Soak tank
- Water

**Harvest Equipment**

- Cooler
- Scales
- Dehydrator
For additional information on Growing Shiitake

http://www.naturalmushrooms.com/index.php

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