

PADDY STRAW MUSHROOM CULTIVATION

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Cultivation Technology of Paddy Straw Mushroom (*Volvariella volvacea*, *V. diplasia*)

a) Nutritional value:

Paddy straw mushrooms are very tasty and good flavoured. These are known to be very nutritious having 26-30 % protein, 9-12 % fibre , 9-13 % ash , 45- 50 % carbohydrate and rich in minerals , vitamins C and B.

b) Spawn production:

Spawn is produced either in rice straw or rye , sorghum , millet or wheat grains . The mycelium in spawn bottle is fast growing, rhizomorphic to cottony, colour is typically whitish to greyish white.

c) Cultivation:

Commonly cultivated varieties of paddy straw mushroom (*Volvariella*) are *V. volvacea* (Bull ex Fr.) Singer, *V. diplasia* (Berk and Br.) Singer and *V. esculenta* (Mass) Singer . This mushroom is commonly cultivated on paddy straw in the open as well as inside a mushroom house. Open cultivation method is very common among marginal and small growers.

1. Open air cultivation:

a) Preparation of beds and spawning:

In this method 100X60cm size foundation beds of 15-20 cm height are made with the help of bricks or mud under the shade, to save them from rains or direct sunlight. Paddy straw bundles of 7-8 cm diameter are made by tying them at one end. The length of these bundles is kept between 70-80 cm. These bundles are

soaked in water for 16-18 hours in a water tank. For chemical sterilization of the straw, bavistin 7g and formalin 125 ml can be added in 100 litre of water. After dipping bundles in water, cover the water tank with the polythene sheet. Later ,bundles are taken out and excess water allowed to drain off on a cemented floor.



Fig. 8.2 Outdoor cultivation: Bed formation by lining wet paddy straw bundles on wooden platforms

A bamboo frame exactly of the size of the bed on foundation is kept on the floor. Now place four bundles of paddy straw (water soaked) side by side over bamboo frame, keeping tied end in one direction. Place another set of four bundles over it but this time tied end in opposite direction. In this way 8 bundles make the first layer of bundles. Scatter the grain spawn about 8-12cm from the edges of the layer bundles. Spread the spawn along with powdered arhar pulse or gram flour. Wheat bran or rice bran can also be added. Place the second row of the bundles and spawn on it as described earlier. Likewise third and fourth layer of bundles are also placed and spawned. Finally, the square shaped bed is covered with a transparent polythene sheet and bed temperature of $32 \pm 1^\circ \text{C}$ is maintained . Within 7-8 days mushroom mycelium permeates the straw completely and at this stage the plastic cover is removed. If the surface of the bed appears to be dry, spray water with the help of water sprayer at least once in a day.



Fig. 8.3 Young pinheads appearing from the beds

a) Fruiting and harvesting:

- Mushroom fruiting occurs nearly 18-20 days after spawning at favourable moisture and temperature conditions. Fruiting continues for another 10-12 days. In paddy straw alone, yield of 12-14 kg /100 kg of wet substrate can be obtained.
- Harvesting of mushroom is done when volva just breaks and mushroom exposes from inside. In any case mushroom should be harvested before it opens. Paddy straw mushrooms are very delicate in nature and can be stored under refrigerated condition for 2-3 days only. Drying of mushroom can be done under shade or in sunlight.

Indoor Cultivation**Indoor Cultivation:**

- The principal of indoor cultivation is the same as that of white button mushroom. Therefore, indoor cultivation of paddy straw mushroom is done inside the mushroom house on pasteurized compost.

a) Substrate:

- Suitable substrates for paddy straw mushroom cultivation are banana leaves, paddy straw, cotton waste etc. For indoor cultivation, rice straw and cotton wastes in 50:50 ratio is preferred which gives more consistent yield.

b) Composting:

- The composting process involves two phases: Phase I is an outdoor process while phase II involves pasteurization and conditioning of the compost.

Phase I (Outdoor composting):

- This mushroom requires very little nitrogen for its growth. Paddy straw and cotton wastes when used in 50 : 50 ratio, will provide 1.4% nitrogen, while some nitrogen is generated by the microorganisms during composting and spawn running processes. The pre-wetted straw and cotton waste are mixed thoroughly and then piled up. Pile raised is narrow with a height of 1.5cm. After 2 days, first turning is given to this pile. During this turning, rice bran @ 50% (w/w basis) is added. Watering is done if required. Remake the pile and leave it for another 2-3 days and only then the compost becomes ready for phase II.

Phase II (Indoor composting):

- After phase-I, compost is taken inside the mushroom house, placed on the shelves and preheated at 40-45 °C. Now steam is introduced in the mushroom house for 2-3 hours so as to raise the temperature of the house to 60-65 °C. This temperature is maintained for another 2-3 hours. The steam supply is then cut off and fresh air given. In next 8 hours temperature of the mushroom house goes to 50-52 °C, which is maintained for another 12 hours or till the smell of ammonia persists in the compost. This process is completed in 4-5 days.

Spawning and Cropping:

When treated beds do not have the smell of ammonia and temperature of the compost cools down to 34-38 °C, spawning is done @ 2% of the compost (w/w). After spawning, doors of the mushroom house are closed for 3-4 days. Temperature during this period remains between 34- 38 °C (but should not be less than 30 °C). R.H is to be maintained between 80-85 % by spraying water daily . Little aeration is also provided. Within 4-5 days, mushroom mycelium spreads in the compost. Then temperature of the mushroom house is lowered to 28-30 °C by opening ventilators. If bed surface appears dry, water is again sprayed. During next 2-3 days, doors are kept open to allow some light.. This condition is maintained till sufficient amount of fruit bodies are formed. When primordia formation is completed, air of the room is circulated for at least 5 minutes for 5-6 times a day. Bed temperature is kept below 32 °C and RH between 85-90%. In next 4-5 days mushrooms become large enough for harvesting.



Fig. 8.4 Mature pinheads formed in Clusters Fig. 8.5 Fruit bodies nearing to their maturity

d) Harvesting:

Fruit bodies are harvested when they become mature and before the cap opens completely, mainly in its egg form. The fruit bodies have got very low keeping quality and hence consumed immediately or they can be canned or dried and packed in sealed polythene bags so that these may be kept for a longer period. Cropping cycle lasts for 7 – 12 days in two flushes

Stages of mushroom





Fig. 8.6 & 8.7 Mature fruit bodies ready for the harvest

d) Yield and Marketing:

Yield varies from 22-28 kg to 25 – 45 kg per 100 kg straw. Due to very low keeping quality, these mushrooms can not be stored even in the refrigerator for more than 15-24 hours. Generally mushrooms are sold fresh or in canned form but rarely in dried form in the market.