



GROW EDIBLE MUSHROOMS ON COCONUT RESIDUES



ICAR-CENTRAL PLANTATION CROPS RESEARCH INSTITUTE

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Mushrooms are fleshy fruiting bodies of fungi technically called the sporophore. Mushrooms collected from the natural habitats are being consumed as a delicious food item from the time immemorial due to their flavour and texture. In India, three types of mushrooms viz. white button mushroom (*Agaricus bisporus*), paddy straw mushroom (*Volvariella volvacea*) and oyster mushroom (*Pleurotus* spp.) are commonly cultivated. Out of these, oyster mushroom is an ideal mushroom for tropical regions due to its ability to grow at a wide range of temperature from 15 to 31°C. Moreover, it has high productivity and fruiting bodies have longer shelf life, also can be easily dried and stored.

Cultivation of oyster mushroom is being done mostly using paddy straw as substrate. But at ICAR-CPCRI, a low cost technology has been developed for cultivation of oyster mushroom utilizing coconut residues such as leaf stalk, bunch waste, leaflets, etc. which are wastes obtained from coconut gardens.

Cultivation of oyster mushroom on coconut wastes involves four steps:

- Preparation or procurement of spawn
- Substrate preparation
- Spawning of substrate
- Crop management

Preparation of spawn

Spawn is a pure culture of mushroom and is used as seed material for mushroom cultivation. It can either be procured from ICAR-CPCRI, Agricultural Universities or reliable private agencies or prepared in polypropylene bags.

Sorghum, paddy, maize or wheat grains are commonly used as substrates for spawn production. The grains are cooked in water for 30 minutes; excess water drained and allowed to cool by spreading over a clean surface.

Calcium carbonate @ 20-30 g/kg of grain is added and mixed well. These grains are filled in polypropylene bags up to 3/4th level and the mouth of the bags are plugged with



cotton. A paper cap is placed over the cotton plug and sterilized in a pressure cooker or autoclave at 1.02 kg/cm² pressure for two hours. After cooling, they are inoculated with discs (6-8 mm diameter) of fungal growth using a sterilized cork borer or inoculation needle. The inoculated bags are incubated at room temperature for 15 to 20 days. The spawn is ready for use when grains are completely covered with white mycelial growth. The first generation fungal culture is called mother spawn, from which further spawns can be produced up to third or fourth generation. 30 spawn bags can be prepared from a single mother spawn.

Substrate preparation

Partially dried leaves and bunch waste of coconut are chopped to 5-7 cm long pieces either manually or using chaff cutter and sun dried. The chopped substrates are soaked in water overnight. Excess water is drained off the next morning. Substrates are then sterilized either by steam pasteurization in an autoclave at 1.02 kg cm² pressure for 1½ h or by immersing in boiling water for one hour (hot water treatment). 200 L capacity petrol drums provided with a detachable lid can also be used as a low cost autoclave, utilizing coconut shell or husk as fuel to generate steam. After sterilization, excess water is drained off so that the substrate retains 70% moisture.

Spawning of substrate

Polythene bags of 60 x 45 cm size (100-150 gauge) are used for bed preparation and about 10 holes (0.5

diameter) are made on sides and bottom for aeration. Bottom of the bag is tied with jute thread to provide flat circular bottom. 20-30 days old spawn (300 g) is taken out in a plastic tray cleaned with 1% Dettol solution (1ml in 100 ml water) and divided into three equal parts and again one portion is apportioned to four equal parts for preparing bed.

Multilayered spawning technique is followed to inoculate the substrate with spawn @ 100 g per bag containing 3-3.5 kg substrate. Sterilized rice bran is added @ 5%

(150g per bag) as an organic supplement to quicken mycelial ramification. The sterilized substrate is filled in polythene bags up to 5 cm height and one portion of spawn is sprinkled along the periphery and a layer of rice bran is added over it to make the first layer. Four such layers are made with 3-3.5 kg of substrate and the tip of the bag is tied with jute thread.



Crop management



After spawning, the bags are incubated for spawn run in a mushroom house. Low cost mushroom sheds can be built within coconut gardens using coconut stem and leaves.

Multi-tier racks made of coconut reapers are fixed inside the shed to place the mushroom beds. The river sand is spread on the floor upto 8 cm height. Inside of the shed is lined with gunny bags. Ventilators with insect proof plastic net should be provided on all sides of the shed for aeration. 80-85 % relative humidity is maintained inside the shed by

periodical watering of the floor and gunny bags on the sides.

The filled up mushroom beds are kept on racks in the mushroom shed for



15-20 days period, during which spawn grows as white mycelium and covers the entire bed. Ideally, a temperature of 20-28°C and relative humidity of about 85% are maintained in the mushroom shed. If any contamination is noticed, the beds should be immediately removed. During this spawn run period, it is better to close the ventilators. After the spawn run, the polythene covers are ripped open and the compact cylindrical beds are placed on racks 20 cm apart.

After 24 hours of removal of polythene covering, ventilators of mushroom shed are opened to get diffused light and aeration. Water is sprayed on the mushroom beds two or three times daily with a sprayer or rose can. The first flush will be ready in 5 to 10 days after opening of the bag. The mushrooms are to be harvested just before the up-curving of the pileus and shedding of spores. The mushrooms should be plucked in the morning before spraying water. After each harvest, about one cm deep layer of substrate is scraped and removed from the entire surface of the bed to obtain the next flush within a short period. Three to four crops can be harvested from each bed. The interval between flushes is normally 7-10 days. Spraying the beds with a solution of 1% urea and 1% superphosphate helps to reduce interval between harvests to some extent.

The spent mushroom substrate obtained after mushroom cultivation can be used to produce compost/vermicompost for use as soil organic amendment.

Mushrooms should be packed in pin holed polypropylene bags or polythene bags and sold on the same day or stored in refrigerator (maximum 3 days). Mushrooms dried in sunlight or in hot air oven at 40-50°C

can be stored for 3-4 months. Dried mushrooms can be rehydrated by soaking in lukewarm water for 20-30 minutes. Oyster mushrooms are used for preparing various dishes like thoran, kurma, soup, pickle, etc.

Nutritive value

Mushrooms are rich in proteins (20-30% on dry weight basis), essential amino acids, iron, potassium, phosphorus, vitamin C, vitamin B complex and fibre but have low starch content, sodium potassium ratio and calorific value. This makes the mushrooms 'health food' and desirable dietary component of diabetics, obesity and hypertension patients.



The cost of mushroom production works out to Rs. 88/- per kg where as the market rate is approx. Rs. 200/- per kg, which shows its profitability. Mushroom cultivation can be done by farm women, unemployed youth, etc. without any additional land requirement utilizing the waste materials available in their coconut gardens.

For procurement of mushroom spawn or any details please write to :

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