

Oyster Mushroom Farming (*Pleurotus* spp.)

Matte A.D. and Gawarkar S.V.

Assistant Professor, Dr. Ulhas Patil College of Agriculture, Jalgaon (M.S.)

SUMMARY

Mushroom are edible fungi which is suitable for wide range of age group. It produces high quantity of quality food which has high biological value grown on many substrates. Mushroom can supply a high protein diet and lower calorific value and it also all kind of amino acids needed by human body. And we all know that there are many different species of mushroom and among those species, oyster mushroom is most commonly cultivated. The steps involve in cultivating oyster mushroom are substrate preparation, spawning of substrate, incubation, fruiting and harvesting. Complete process takes 25-30 days to get a good and healthy yield but due to the lack of knowledge related to production technology, agroclimatic requirement and crop management oyster mushroom production has decreased therefore, the main objective behind writing of this article is to learn more about the production technology to reach out the appropriate farming of oyster mushroom.

INTRODUCTION

Oyster mushroom which is popularly known as Dhingri in North India is a basidiomycetous fungus that belong to genus *Pleurotus*. It is cellulose loving fungus and grows naturally in the temperate and tropical forests on dead and decaying wooden logs or sometimes on dying trunks of deciduous or coniferous woods in different parts of the world. It may also grow on decaying organic matter. The fruit bodies of this mushroom are distinctly shell or spatula shaped with different shades of white, cream, grey, yellow, pink or light brown depending on the species. The cultivation of *Pleurotus* species on trees stumps and logs was first described by Flack in the year 1917. Since then much progress has been done in its cultivation. At present it is produced worldwide. China is the world leader in production of oyster production. Oyster is the third largest cultivated mushroom. India produces about 1500 tonnes of oyster mushroom due to low demand. Korea, Japan, Italy, Taiwan, Thailand,



Pleurotus florida



Pleurotus flabellatus



Pleurotus sajor-caju



Pleurotus cornucopie



Pleurotus ostreatus



Pleurotus eryngii

Philippines also produce oyster mushroom. The cultivation of *Pleurotus* species, commonly called as Oyster mushroom or Dhingri is gaining popularity because of its diverse ability of growth at a wide range of temperature (15-30 °C) and on various agricultural waste materials.

Commonly Cultivated Species

- ***Pleurotus florida***- The colour of this species changes with temperature. At low temperature (about 5°C) the pileus is of light brown colour; at maximum temperatures for the development of fruit bodies (25°C) it turns paler to pallid yellow or white.
- ***P. flabellatus***- It is pure white in colour. Fruit bodies always appear in large clusters. The pileus is having thin flesh with mild aroma. On cooking it gives slightly leathery or fibrous texture, specially the stem portion.
- ***P.sajor-caju***- It is indigenous species first cultivated by Jandaik in 1974 on banana pseudostems. The fruiting bodies are pale grey to dark in colour with good aroma. Temperature requirement is from 25 °C to 30 °C. At CCSHAU, gamma irradiated strains of *Pleurotus* have been developed which produce fruit bodies at 10-15 °C.
- ***P. cornucopiae*** – The colour is dull-ochreous, pallid whitish to light yellow colour and cap 4-10 cm in diameter. It grows well at 15±2°C.
- ***P. ostreatus***- It can fruit at 15°C and is of grey, grey brown or slate grey colour. It spores are known to be causing allergy in many cases.
- ***P. ostreatus* (grey)** – The fruiting bodies are dark slate grey to bluish grey in colour with thick non-fibrous and good aroma of flesh. The gills are white.
- ***P. eryngii***- It is widespread in southern Europe and the areas of Central Asia and North Africa. In India it is found in Jammu and Kashmir. It occurs as parasite on the roots of *Eryngium campestre*. The colour is reddish brown, grey brown to dirty yellow, cap is 4 to 5 cm wide. The weight of the single fruit body is 300-400g.

Cultivation Method and Process

The simple container like polythene bags, polythene tubes, gunny bags, bamboo baskets, wooden trays, plastic sacks and plastic boxes etc. can be used. In all these cases however care should be taken for the exchange of gases by inserting some perforated tubes in the substrate heap to avoid anaerobic fermentation. Some of the popular methods of cultivation employed are

Bag system- The polythene bags with holes made in them are best containers for oyster mushroom cultivation. Substrate is filled in the polythene bags and spawned simultaneously. The mouth of the bag is tied or folded and kept for spawn running.

Bed system- The racks made out of bamboo material can be utilize for this type of cultivation. The inoculated substrate should be spread on the racks to a thickness of 9 inches and covered with polythene sheet for good spawn run and also to minimize the evaporation of water.

Tray system- Wooden plastic trays or empty fruit boxes can be used.

Pillar system- A self supporting structure is created by inserting a perforated cement or PVC inside the pillar containing substrate. The perforated tubes gives chimney effects for exchange of gases. Polythene tube with 1-2ft. diameter and a height of 5-6ft. would accommodated a minimum of 25 kg dry straw and yield 20-3- kg of fresh mushrooms.

Cultivation process

The procedure for oyster mushroom cultivation can be divided into four following steps-

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

Preparation of spawn

Oyster mushrooms are grown from mycelium propagated on a base of steam sterilized cereal grain viz., jowar, bajra, wheat, rye, etc. jowar and bajra grains are superior over wheat grains. This cereal grain/mycelium mixture is called spawn and is used to seed mushroom substrate. For mycelial growth on cereal grains about 10-15 days are required. The pure culture of *Pleurotus* spp. is used for inoculation on sterilized substrate.



Substrate preparation

The *Pleurotus* species has the ability to break down cellulose and lignin bearing material without chemical or biological preparation. The straw is soaked overnight in water. This is done to achieve the moisture content of 7 per cent. It also helps in the removal of some surface contaminants on the straw.

The different method of substrate Sterilization, one of which can be used are as follows

Chemical sterilization: It is done with fumigants like formaldehyde and fungicides. 7g carbendazim + 125 ml formalin can be added to 100 lit. of water for soaking 30 kg wheat straw.

Steam sterilization: Steam sterilization is done by injecting steam generated in the boiler to a chamber stacked with substrate material to be disinfected. The temperature is maintained in the chamber at 60-65 °C for 4 hr. or at 80 °C for 30 minutes.

Hot water sterilization: Hot water treatment is given by dipping the substrate in boiling water (80-85°C) for 30 min.

Solar sterilization: After wetting, the substrate spread on a clean surface/sheet up to a height of 1 feet and covered with transparent polythene sheet in the sun. It should be in the sunlight for 4 hrs.

Sterile technique: it is also known as till method. The chopped substrate after soaking in cold water is put in heat resistant polypropylene bags and sterilized in autoclave at 20 p.s.i. pressure for 1-2 hours followed by spawning after cooling under aseptic conditions. This method is more suitable for research work rather than commercial production.

Spawning of substrate

Spawning the process of inoculating or broadcasting the spawn on the substrate. There are many methods of spawning but usually multilayer and thorough spawning are common for the oyster mushroom. Pasteurized substrate at 25 °C with moisture percentage of 75% is used for spawning.

Multilayer spawning: In this method, the substrate is filled in container upto a thickness of 3'-4' and thereafter spawn is broadcasted. After each layer a gentle pressure is to be applied on the substrate layer. On layer of substrate, equal and uniform spawn should be broadcasted. Polythene bags, trays or racks can also be used for substrate spawning.

Temperature: Temperature should be maintain at 23±25 °C.

RH: RH should be about 80-85%

Moisture: Regular watering of walls and floors should be done for maintaining humidity.

This condition should be maintained for 15 to 20 days till the mycelium grows and cover entire straw.

Cropping

Fifteen to twenty days after spawning, there is complete mycelial impregnation in the substrate which becomes white in colour due growth of the fungus. Light is the irritating factor in the development of primordial, therefore needed for at least 15 minutes per day. Temperature and humidity too have an effect on the yield.

Harvesting and Marketing

Mushroom should be harvest when the pilus is about 5-6 cm in diameter and before spores are released. The fruit bodies should be harvested by twisting them, so that broken pieces are not left in the substrate and surrounding fruiting bodies are not disturbed. After harvesting the lower portion of the stalk with adhering debris etc. should be cut with the help of clean knife blade. This mushroom may be consumed fresh or dried in the sun or a mechanical dehydrate at 50-60 °C. This mushroom can be powdered and stored in air tight containers and used whenever required.

Precaution while growing oyster mushroom

Oyster mushroom produce millions of spores which can be easily seen as spore clouds in the cropping rooms in early morning. Many times growers working in cropping rooms complain of headache, fever, joint pains, nausea and coughing due to *Pleurotus* spores. Mushroom pickers are advised to open the doors and ventilators or switch on exhaust fans 2-3 hours before entering the cropping room. Pickers should use respiratory masks in growing rooms and change cloths after coming out from growing rooms.

CONCLUSION

From this article it is concluded that for the cultivation of oyster mushroom it is necessary to understand its cultivation methods and process, favorable environment to get better yield and all these practices should be done in proper hygienic conditions.

REFERENCES

- Bano,Z., and Srivastava, H. C. 1962. Studies on cultivation of *Pleurotus* sp. On paddy straw. *Food Sci.* 12:363-365.
- H. S. Garcha, 1980. *Mushroom Growing*. Punjab Agriculture University, Ludhiana-1410024, 54p.
- Padwick G.W., 1941 *Mushroom cultivation in India*. *Indian farming*, 11:363-366.
- R. C. Upadhyay, 1990. *Cultivation of Oyster Mushroom*. National Centre for Mushroom Research and Training, Chambhat, Solan-173213, Himachal Pradesh.
- Randive Sonali D. *Cultivation and study of growth of oyster mushroom on different agricultural waste substrate and its nutrient analysis* . *advances in Applied Science Research* . 2012;3(4): 1938-1949.
- Sharma Soniya, Ram Kailash, P. Yadav, Chandra P. Pokhrel. *Growth and yield of oyster mushroom (Pleurotus ostreatus) on different substrate* . *journal on New biological reports*. 2013;2(1):03-08.
- Yash Gupta and S. R. Sharma, 1994. *Mushroom Spawn Production*. National Centre for Mushroom Research and Training, Chambhat, Solan-173213, Himachal Pradesh.