International Journal of Ecology and Environmental Sciences
www.ecologyjournal.in
Online ISSN: 2664-7133, Print ISSN: 2664-7125
Received: 06-08-2021, Accepted: 22-08-2021, Published: 07-09-2021
Volume 3, Issue 3, 2021, Page No. 190-192

Growth of pleurotus florida on different agricultural substrates (Oyster mushroom)

Ku Snehal Magar, Ashok Chavan, Shrikant Mane, Amar Waghule
Department of Botany, Dr Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra, India

Abstract
Pleurotus species were cultivated on various agro wastes. The experiment was undertake to determine total yield obtained during three harvests of pleurotus florida. The yield and biological efficiency for all pleurotus species on different agro wastes was compared. soyabean straw was found to be a potential substrate for cultivation of pleurotus Florida and biological efficiency on soyabean 73.064% while black gram 64.225, sugarcane 62.225.pleurotus Florida yielded better on substrate soyabean 730.64gm, blackgram 642.25gm sugarcane 629.83gm respectively. Hence it was concluded that soyabean gives higher yield as compared to black gram and sugarcane. Soyabean is best substrate for growth of pleurotus Florida.

Keywords: oyster mushroom, agricultural substrates, florida yielded

Introduction

Background information

Oyster mushrooms represent Basidiomycetes fungi characterized by edible fruit bodies with eccentric stalk attached to the Pileups that opens like an oyster shell during morphogenesis. These mushroom namely Pleurotus species are described as "food delicacies" because of their characteristic biting texture and flavor.

Cultivation of different species of oyster mushroom around the world represents the commercial, large scale conversion of lignocelluloses residues into food. These mushroom are the efficient producers of food protein from worthless plant wastes owing to the degrading ability of lignocelluloses unlike button mushroom, do not require composted substrate for their growth.

In India, there are five mushroom species *viz*., white button mushroom (Agaricus bisporus), Oyster mushroom (Pleurotus spp.), paddy straw (Volvariella volvacea), and milky mushroom (Calocybe indicia) and (Lentinula edodus) are in commercial cultivation.

There has been significant increase in production of mushroom in the last few years, especially of the oyster and paddy straw mushroom in India. The country's production in 2010 was 1 lakh metric tons, at which button mushroom accounted for 89% of the total production, followed by oyster (6%) milky (1%) and other (4%). Punjab Uttrakhand, Haryana, Uttar Pradesh and Tamilnadu were the leading producers of mushroom in the country at the time of 2010.

The present production status revealed that, Maharashtra and Odisha are emerging as the leading states in mushroom production, by considering the present production data, mushroom industry in India recorded an average annual growth rate of 4.3% during this period, and the productivity has risen from 20 % to 24.5 % by the releasing of improved strains in commercial edible mushroom.

These mushrooms can be grown successfully in areas under controlled temperature and Humidity. Fresh mushroom will be collected in three plucking from the plant residues during a short span of time. They can be grown ideally in villages and in urban areas. This is a simple low cost technology resulting in higher productivity and monetary returns. Accordingly it has a great prospect to emerge as an excellent cottage industry; it can provide employment opportunities for men, women and unemployed youth and also supplement the income of the farmers during the lean month of farming. Being an indoor activity, its cultivation is a landless, small and marginal farmers having uneconomic land holding. As its consumption is increasing world over owing to its nutritive value, it has good opportunity in finding foreign market there by earning foreign exchange.

Mushroom farming in India become successful and also popularized day by day because of its very low input, which can bring a significant change in rural economy. The climatic condition of the region has been found to be ideal for such an attempt.

Pleurotus Florida was cultivated on various agro wastes. The experiment during three harvest of Pleurotus Florida. The yield and agro waste was compared. The average period for three harvest required Pleurotus Florida respectively. Soyabean straw was found to be a better on Soyabean, sugarcane, black gram respectively. Pleurotus Florida performed better on all straw. It was concluded that soyabean is promising substrate for the cultivation.

In this region, Pleurotus Florida is commonly cultivated on sugarcane, soyabean, black gram. The main objective of present investigation was to workout agro waste potential for cultivation of Pleurotus florida (oyster mushroom).

Materials and Methods

Cultivation of Pleurotusspecies (Oyster Mushroom)

The cultivation of oyster mushroom or Pleurotus is relatively simple. The agro-climatic conditions in our country especially in the North Indian State are conductive for mushroom cultivation when the temperature is15-30° C and relative humidity is 70%. The production decreases during peak periods of winter.

Material requirement

1. Substrate

The different organic waste used as substrate for mushroom Pleurotus florida bedpreparation

a. soybean Straw
b. sugarcane Straw
c. Black gram Straw

2. Mushroom Lab

The mushroom lab having size 9x12 Feet in Department of Botany.

3. Wooden racks

4. Polythene bags

Polythene bag is used as a container for mushroom cultivation. Polythene bags with 14x22 cm size.

5. Pleurotus Spawn (Pleurotus florida)

Mushroom (Pleurotus florida) culture and prepared spawn was obtained. Chemicals: Bavistin (Carbendazim 50% WP (75.ppm), Formaldehyde (37-40%). 2 Methods:

6. Climate and other conditions

Pleurotus spp. is one of the choice edible mushrooms which can be cultivated in the tropic. It has gained importance only in the last decade and is now being cultivated in many countries in the subtropical and temperate zones. Different species of Pleurotus are suited for growing within a temperature range
Of 15 to 30oC.

7. Spawn Preparation

The term 'spawn' refers to cereal kernels overgrown by mushroom mycelium. Spawn is used as "seed" for inoculating substrates with the mushroom mycelium.
Spawning is carried out aseptically, preferably using the same transfer chamber or the same inoculation room as is used in spawns preparation. Grain or sawdust spawn is commonly used to inoculate the substrate in bags. With grain spawn, the bottle is shaken to separate the seed colonized with the white mycelium. After lifting the plug and flaming the mouth of the bottle, a few spawn and the plug of the compost bag are replaced and the next bags are then inoculated. The newly inoculated bags are slightly titled to distribute the grains evenly in the shoulder area of the bag around neck. For sawdust spawn, the spawn is broken up with an aseptic needle. A piece of the spawn may then be transferred, using a long flat-spooned needle especially designed to scope the spawn. One bottle of grain or sawdust spawn in a 500ml dextrose bottle is sufficient to inoculate 40 to 50 bags.

8. Sterilization and preparation of substrates

For cultivation of mushroom different substrates, *viz*. were soya bean straw, sugarcane, black gram, were selected and they were sterilized as follows: these agro waste were soaked in water for 12 hours before use to soften the tissues. All these agro waste were chemically sterilized in plastic pots as shown in plate No.1.25 liters of water are taken in plastic pots. 5kg of all agro waste slowly dipped in water. In another plastic bucket, Carbendazim 50% WP (75.ppm)
Bavistin 7.5g and 25 ml formaldehyde (37-40%) is dissolved and slowly poured on the already soaked straw. Straw is pressed and covered with a polythene sheet. After 24 h straw is taken out and excess water straw drained.
The lab should be fumigated with the chemicals formalin and KMnO4. The preferable room temperature is 26+or -2oC with relative humidity of 70-80%.

9. Bag filling Method

Bag filling method was used throughout the studies. The polythene bags of 14x22 cm and the bottom of the bags were tied with a rubber to provide a flat circular bottom to the mushroom beds. Dry weight of the substrates was recorded and the bags Full of different substrates were weighed and were maintained at 1kg. In a bag for each substrate. The first layer was filled with the substrate up to 5 cm height. The spawn was sprinkled over the entire surface of the substratum. Similarly four such layers were filled with the substratum. Inoculation was made with pure grain spawn at 10 gram per kg of substrate on dry weight basis under aseptic conditions. The bags were tied and two vents of one cm diameter were provided.

10. Spawn running

After spawning, the beds were incubated in the lab. This is known as spawn running. Spawn run refers to the vegetable propagation of fungal mycelium in the substratum. It was a pre-requisite for the subsequent reproductive growth phase (fruiting).

11. Incubation

The spawned compost bags are kept in a dark room until the mycelium has fully penetrated to the bottom of the substrate. In 20 to 30 days, depending upon the substrate/substrate combination, the substrate appears white, due to the growth of the mycelium. The bags are kept for an additional week before they are opened to check that the mycelium is mature enough to fruit. Most strains of the mushroom from primordial after 3 to 4 weeks of mycelia growth. The bags are opened, to initiate fruiting, inside a mushroom house.

- The agro waste soya bean, sugarcane, black gram were collected from local farms/places and were used for filling the bags.
- The substrates were chopped in 2-3 cm pieces and soaked in water over night to moisture it and excess water was drained off.
- After soaking, the substrate was Chemical sterilizer. The polythene bags of the size 14x22 cm were filled with sterilized substrate and multi layered technique was adopted for spawning.
- Each bag was filled with 1kg dry substrates and the spawn was added at the rate of2% of the wet weight basis of substrate. Pinning of bags was done for proper aeration.

After inoculation the nags were kept in room where the temperature and humidity were maintained around 25 degree C and 80 to 90% humidity respectively with sufficient light and ventilation for 20 days. Formation of fruit bodies was evident within 3-4 days after removal of poly bags. The beds were maintained up to the harvest of the third flush, which was completed in 35 days after spawning.

12. Harvesting

As soon as the fruiting bodies developed and attained their full size, they were cut just above the surface of the substrate with

sharp knife or blade. Scrape out 1 cm outer layer of the bed first harvest and do not sprinkle water for 12 hours. From the second day onwards sprinkle water. Within 3 to 4 days basidiocarps develop.

13. Weighing

The fresh weight of basidiocarps at each harvest was taken. The total yield is expressed in terms of bio efficiency being percentage weight of the mushroom on dry weight of substrate.

14. Yield and Biological efficiency (B.E)

Total weight of all the fruiting bodies harvested from all the three pickings were measured as total yield of mushroom. The biological efficiency (yield of mushroom per kg substrate on dry wt. basis) was calculated by the following formula Chang *et al*, (1981) [4].

$$B.E\ (\%) = \frac{\text{Fresh weight of mushroom}}{\text{Dry weight of substrate}} \times 100$$

Table 1: Effect of substrate on yield and Biological efficiency on growth of Pleurotus florida

Sr. No.	Substrate	Yield (gm./1kg of dry substrate)			Total yield	Biological Efficiency %
		I	II	III		
1	Soybean	353.32gm	270.72gm	106.60gm	730.64gm	73.064%
2	Sugarcane	328.92gm	213.44gm	87.47gm	629.83gm	62.983%
3	Black gram	341.62gm	202.13gm	98.50gm	642.25gm	64.225%

Conclusion

The Present study explored the possibilities of cultivating Pleurotus florida on different agro waste. Soyabean is one of the major cash crop of this region was found to be the most suitable agro waste for oyster mushroom cultivation.

The highest yield of Pleurotus florida on soyabean straw indicated wide scope for mushroom cultivation. This can also be considered as an agribusiness for the people of this region. To improve their financial status and health, Mushroom cultivation converts energy stored in the straw, to provide protein rich foods for human and animals. The agro waste thus can be used more efficiently instead of burning of them to generate heat energy also may cause air pollution.

References

1. Adebayo EA, Alao MB, olatumbosun OO, omoleye EO, omisakin OB. Yield evaluation of Pleurotus (oyster mushroom) on different Agricultural wastes and various grains for spawn production. If journal of science,2014:16:3.
2. Arun Ingle, Anita Ramteke. Studies on cultivation and biology efficiency of mushroom grown on different agro residues. Innovative Romanian Food Biotechnology, 2010, 6.
3. Chadha KL, Sharma SR. Mushroom research in India-History, infrastructure and achievements. INS: Advances in Horticulture, Maharashtra publishing House, New Delhi,1995:13:1-29.
4. Chang ST, Miles PG. Mushroom cultivation, Nutritional value, Medicinal effect, and Environmental Impact (2nd edition), CRC press, New York, 2004.
5. Iqbal B, Khan H, Salfullah IK, Shah B, Naeem A, Ullah W, Ahmed N. Substrate evolution for the quality, production and growth of oyster mushroom (Pleurotus florida) Journal of Entomology and Zoology studies,2016:4(3):98-107.
6. Jandaik CL, Goyal SP. Farm and farming of oyster Mushroom (Pleurotus sp.) In mushroom production technology (Eds. Singh, R. P. and chaube, H.S). G B. Pant Univ. Agri. And technology Pantnagar India, 1995, 72-78.
7. Jiskami MM. A brief outline The Fungi" cultivation of mushroom. Izhar pub. Tandojam P.94.
8. Poope J. Use of the agricultural waste material in the cultivation of mushroom sci,2000:15:3-23.
9. Jiskami MM. A brief outline The Fungi" cultivation of mushroom. Izhar pub. Tandojam, 1999, 94.
10. Rajarathnam S, Bano Z. Pleurotus mushroom part 3, Biotransformation of natural lignocellulosic waste commercial application and implication critical review in food science and Nutrition, 28, 31-113
11. Randive SD. Cultivation and study of growth of oyster mushroom on different agricultural waste substrate and its Nutrient analysis. Adv. Appl. Sci. Res,2012:3:1938-1949.

International Journal of Ecology and Environmental Sciences

Indexed Journal, Refereed Journal, Peer Reviewed Journal

Online ISSN: 2664-7133, Print ISSN: 2664-7125, Impact Factor: RJIF 5.28

Publication Certificate

This certificate confirms that **"Ashok Chavan"** has published article titled **"Growth of pleurotus florida on different agricultural substrates (Oyster mushroom) "**.

Details of Published Article as follow:

Volume	:	**3**
Issue	:	**3**
Year	:	**2021**
Page Number	:	**190-192**
Certificate No.	:	**3-3-41**
Date	:	**7-09-2021**

Regards
International Journal of Ecology and Environmental Sciences
www.ecologyjournal.in
Email: ecology.article@gmail.com