Int.J.Curr.Microbiol.App.Sci (2021) *10*(10): 307-313

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 10 Number 10 (2021)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2021.1010.038

Oyster Mushroom Cultivation with Reference to Climate

K. Chitra[1]*, K. Dhanalakshmi[2], N. Indra[3] and V. Ambethgar[1]

[1]Tamil Nadu Rice Research Institute, Aduthurai,
[2]KVK, Vamban, Tamil Nadu Agricultural University, Coimbatore, India
[3]ARS, Yethapur, Tamil Nadu Agricultural University, Coimbatore, India
**Corresponding author*

Keywords

Mushrooms, chlorophyll, protein, malnutrition, lignocellulose

Article Info

Accepted:
15 September 2021
Available Online:
20 October 2021

A B S T R A C T

Cultivation of species oyster mushroom (*Pleurotus ostreatus*) was initiated on experimental basis in Germany by Flack during the year 1917 on tree stumps and wood logs. Growing technology was perfected in USA. The major states in India producing oyster mushroom are Orissa, Karnataka, Maharashtra, Andhra Pradesh, Madhya Pradesh, West Bengal and most of the North Eastern hill states. Mushroom is rich in Vitamin C and B complex and the protein content ranges from 1.6 to 2.5 per cent. The niacin content is about ten times higher than any other vegetables. The folic acid present in oyster mushroom helps to cure anemia. It is suitable for people with hyper-tension, obesity and diabetes due to its low sodium: potassium ratio, starch, fat and calorific value, alkaline ash and high fiber content make them suitable for consumption for those having hyperacidity and constipation. Oyster mushroom (*Pleurotus* spp.) is fungal fruiting body. A study was undertaken for identifying the best oyster mushroom variety which is suitable to Tiruchirapalli climate. Three oyster mushroom varieties were taken for the study *viz.*, MDU-1, APK-1, CO-2. The isolation was made from mushroom mycelium. These isolates were cultured under PDA medium. Among the isolates CO-2 and MDU-1 produced good growth of mycelium with a prescribed time limit. The paddy straw and paddy seeds were used for mushroom and spawn production. However, the result showed maximum yield MDU-1(3270 g) when compared to CO - 2 (2780 g) and APK-1 (2280g). Oyster mushroom can be growing at moderate temperature ranging from 20 to 30^0 C and humidity 55-80% for a period of 6 to 8 months in a year. This MDU - 1 was found to perform well with maximum yield in Tiruchirapalli conditions.

Introduction

Mushrooms, a group of fungi (macro fungus), which lacks chlorophyll and grows either parasitically or saprophytically. Mushrooms with their flavor, texture, nutritional value and high productivity per unit area have been identified as an excellent food source to alleviate malnutrition in developing countries (Eswaran & Ramabadran, 2000). Mushrooms contain 20– 35% of protein (dry weight), are low in lipids and contain all the nine essential amino acids (Kalac. 2009). Mushroom has been widely cultivated since the 1700's and

presently more than 30 unknown species are cultivated as foods. Oyster mushroom (*Pleurotus* spp.), commonly known as "Dhingri" in India, is a lignocellulose loving fungus growing in nature on living or dead tree trunks/stumps or bark. They are easily recognized in nature due to their peculiar morphology with an eccentric short stem or stipe. The Oyster mushroom has been found to be ideal for people suffering from anaemia, hyperacidity, and constipation. Oyster mushrooms are native to Northeastern United States. *Pleurotus species (*oyster fungus) is an edible mushroom having excellent flavour and taste (Shah *et al*., 2004). Oyster fungus are rich source of proteins, minerals & vitamins (Caglarirmak, 2007). Cultivation of oyster mushroom has increased tremendously throughout the world because of their abilities to grow at a wide range of temperature and utilizing various agro-based residues. Growing oyster mushrooms convert a high percentage of the lignocellulosic substrate to fruiting bodies increasing profitability. It requires a short growth time in comparison to other edible mushrooms.

Mushroom survival and multiplication are related to a number of factors, which may act individually or have interactive effects among them (AMGA, 2004). Temperature is one of the most important physical factors affecting the growth and development of oyster mushroom.

The oyster mushroom confers advantages over other mushrooms for its ability to grow on wide range of temperature from 18 to 30°C and fast mycelial growth coupled with rapid colonization of substrates are the other characteristics features of this species (Rajarathnam & Bano, 1987). Hence, there is vast potential for the cultivation of oyster mushroom. The temperature determines the mycelial growth as well as fruiting bodies production

Materials and Methods

Preparation of substrate

Paddy straw is chopped into bits of size 2-3'' for easy handling and operation and these substrates was soaked in water for about 8 hours to get wet and achieved 65-70 % of moisture content. All these wet substrates were separated from water and excess water was removed properly and then boiled the contents for 1 hour. After cooling, the substrates were thus ready to be used in mushroom cultivation (Srivastava, H. C., & Bano, J. 2010).

All instruments, glassware's and culture media were sterilized by autoclaving with 15 PSI at 121^{o}C for 1-2 hours. The culture room of the laboratory was cleaned by gently washing with detergent followed by 70 % ethyl alcohol regularly. We prepared 100 bags (Each 25 bags per crop) for mushroom cultivation at the periodical interval of 10 days for continuous harvesting of mushroom.

Results and Discussion

The mushroom production activity is low investment indoor activity. Cultivation technology of oyster mushroom is very simple which does not require costly infrastructure facilities. Theoretically each crop takes 45- 55 days and under controlled conditions and hence there can be 8 crops per year. The mushroom from each bag was harvested and weighed periodically.

In each experiment 25 bags were sown. First seeding was done in the month of January and the subsequent bags in the succeeding month. The crop of Oyster mushroom was harvested in four flushes. The maximum yield was recorded in crop 2 of about 25936 gm (25.94 kg).The crop 4 had showed reduced yield of about 21145gm (21.15 kg). The yield of the

crop 4 was smaller than the yield from others, this might be due to the month April and May (350C and 40ºC) showed high temperature and low relative humidity resulted in low yield. This showed that the yield of mushroom was significantly influenced by temperature and relative humidity. This leads to malformed mushroom due to high temperature and low relative humidity. The overall yield improvement in first and second harvest as explained due to optimum temperature and relative humidity for the development of mycelium, which helped in improving the yield of mushroom.

Table.1 Yield of oyster mushroom (Crop 1) January 22, 2018 – March 15, 2018

Bag	1 Harvest	2 Harvest	3 Harvest	4 Harvest	Total yield per bag (gm)
1	270	360	240	140	1010
2	260	520	300	-	1080
3	375	420	225	160	1180
4	360	445	310	150	1265
5	325	410	-	200	935
6	235	390	145	-	770
7	310	295	280	165	1050
8	340	490	235	70	1135
9	300	310	215	80	905
10	290	510	90	-	890
11	225	485	180	-	890
12	310	460	225	180	1175
13	175	435	315	-	925
14	340	390	235	-	965
15	340	490	235	-	1065
16	360	445	310	150	1265
17	290	510	125	115	1040
18	190	395	240	-	825
19	325	540	215	-	1080
20	260	520	300	100	1180
21	370	550	240	-	1160
22	290	510	90	-	890
23	100	435	225	90	850
24	225	400	350	210	1185
25	325	410	200	200	1135
Total yield (Kg)					25.85

Table.2 Yield of oyster mushroom (Crop 2) February 10, 2018 – March 30, 2018

Bag	1 Harvest	2 Harvest	3 Harvest	4 Harvest	Average yield per bag (gm)
1	300	510	200	170	1180
2	220	485	275	80	1060
3	270	445	205	170	1090
4	310	407	340	-	1057
5	245	405	200	-	850
6	340	410	325	-	1075
7	360	400	355	85	1200
8	290	425	115	200	1030
9	265	510	170	-	945
10	340	490	235	-	1065
11	300	310	215	100	925
12	275	510	140	-	925
13	275	400	300	230	1205
14	260	435	360	-	1055
15	315	435	310	-	1060
16	300	555	315	210	1380
17	200	410	320	100	1030
18	270	380	320	-	970
19	273	365	245	100	983
20	90	210	50	-	350
21	325	540	140	-	1005
22	310	550	300	-	1160
23	226	410	220	110	966
24	225	445	360	195	1225
25	300	460	255	130	1145
Total yield (Kg)					25.93

Table.3 Yield of oyster mushroom (Crop 3) February 25, 2018 – April 15, 2018

Bag	1 Harvest	2 Harvest	3 Harvest	4 Harvest	Average yield per bag (gm)
1	295	310	220	-	825
2	210	215	177	90	692
3	375	420	225	120	1140
4	200	425	320	-	945
5	270	510	285	40	1105
6	272	490	350	-	1112
7	90	310	275	-	675
8	325	510	255	-	1090
9	265	435	270	200	1170
10	330	445	140	-	915
11	280	510	240	-	1030
12	345	395	320	-	1060
13	175	200	325	50	750
14	340	520	220	-	1080
15	340	550	245	-	1135
16	360	445	200	-	1005
17	290	510	135	-	935
18	190	395	235	-	820
19	325	200	220	-	745
20	260	520	180	-	960
21	370	550	320	-	1240
22	290	405	140	-	835
23	100	410	230	-	740
24	225	400	270	-	895
25	325	425	190	-	940
Total yield (Kg)					23.83

Table.4 Yield of oyster mushroom (Crop 4) March 20, 2018 – May 05, 2018

Bag	1 Harvest	2 Harvest	3 Harvest	4 Harvest	Average yield per bag (gm)
1	240	343	245	-	828
2	200	333	295	-	828
3	310	411	255	-	976
4	275	398	326	-	999
5	235	439	100	-	774
6	320	475	322	-	1117
7	235	305	222	-	762
8	345	490	210	70	1115
9	300	310	215	80	905
10	275	455	177	-	907
11	325	300	55	-	680
12	197	372	-	-	569
13	238	415	315		968
14	355	-	-	-	355
15	360	259	-	-	619
16	285	360	115	-	760
17	290	435	255	-	980
18	230	395	300	-	925
19	295	345	295	-	935
20	230	400	100	-	730
21	270	468	140	-	878
22	265	370	90	-	725
23	330	430	215	-	975
24	280	410	350	-	1040
25	345	390	60	-	795
Total yield (Kg)					21.14

References

Bano, Z., Rajarathnam, S., & Nagaraja, N. (1987). Some important studies on *Pleurotus* mushroom technology. In International conference on science and cultivation technology of edible fungi. Jammu Tawi, India (pp. 53-64).

Çağlarırmak, N. (2007). The nutrients of exotic mushrooms (*Lentinula edodes* and *Pleurotus species*) and an estimated approach to the volatile compounds. *Food chemistry*, *105*(3), 1188-1194.

Das, N., & Mukherjee, M. (2007). Indoor Cultivation of *P. ostreatus*. *Philo Agric*, *61*, 253-262.

Dundar, A., Acay, H., & Yildiz, A. (2008). Yield performances and nutritional contents of three oyster mushroom species cultivated on wheat stalk. *African Journal of Biotechnology*, *7*(19).

Eswaran, A., & Ramabadran, R. (2000). Studies on some physiological, cultural and post-harvest aspects of oyster mushroom, *Pleurotus eous* (Berk.) sacc.

Kalač, P. (2009). Chemical composition and nutritional value of European species of wild growing mushrooms: A review. *Food chemistry*, *113*(1), 9-16.

Khan, A. M., Khan, S. M., & Khan, S. M. (2001). Studies on the cultivation of Oyster mushroom *Pleurotus ostreatus* on different substrates. *Pakistan J. Phytopath*, *13*(2), 140-143.

Pathmashini, L., Arulnandhy, V., & Wijeratnam, R. S. (2009). Cultivation of oyster mushroom (*Pleurotus ostreatus*) on sawdust. *Ceylon Journal of Science (Biological Sciences)*, *37*(2).

Srivastava, H. C., & Bano, J. (2010). Studies on the cultivation of *Pleurotus* species on paddy straw. *Food Sci*, *11*, 36-38.

Srivastava, H. C., & Bano, J. (2010). Studies on the cultivation of *Pleurotus* species on paddy straw. *Food Sci*, *11*, 36-38.

How to cite this article:

Chitra, K., K. Dhanalakshmi, N. Indra and Ambethgar, V. 2021. Oyster Mushroom Cultivation with Reference to Climate. *Int.J.Curr.Microbiol.App.Sci.* 10(10): 307-313.
doi: https://doi.org/10.20546/ijcmas.2021.1010.038