



Effect of Different Culture Media on the Mycelial Growth of *Pleurotus ostreatus*

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ABSTRACT

Growth study and Dark Culture of *Pleurotus ostreatus*, an edible mushroom were studied. A series of experiments were carried out to investigate the effects of various growth conditions and development of *Pleurotus* spp. Among these media tested, Mushroom Complete Agar(MCA) was found to be the best medium and the mycelial growth was excellent. Czapek-Dox Agar(CDA) medium was the least stimulatory and supported the poorest growth. The Potato Dextrose Agar(PDA) for the growth of mycelium of *Pleurotus* spp. All these are cultured at pH 7 under aseptic conditions and maintained at 25^o C.

Keywords: Media, wild *Pleurotus* species, mycelial growth, growth study, dark culture .

Introduction

Mushroom, a macro fungus with a distinctive fruiting body, is a unique biota which assembles its food by secreting degrading enzymes. Oyster mushroom grows wild on logs and stumps of trees in forests during monsoon. It belongs to the class Basidiomycetes subclass Hollobasidiomycetidae, order Agaricales and family Pleurotaceae (Alexopolous and Mims, 1996) and comprises about 40 species (Jose and Janardhanan, 2000). They are widely used as delicacies in different parts of the world because of their excellent flavor and taste (Jonathan and Esho, 2010). Mushroom growth is highly influenced by several factors such as spawn, growing media, pH, temperature, moisture content and light intensity (Kadiri and Kehinde, 1999). The maintenance and production of a reliable pure culture spawn with required potentials is a key operation and the first critical stage for successful mushroom cultivation. Storage and maintenance of mushroom species in a pure, viable and stable condition is essential for their use as reference strain, both in research and industrial scales (Bhatt et al., 2010). The identification of suitable agar media, substrate and incubation temperature is essential to obtain high yield and quality of mushroom.(Hasan Sardar et al., 2015). Mushrooms are good sources of sugars, fiber, protein and minerals (Senatore, 1990; Adewasi et. al. 1993), with comparable amino acid with animal protein (Aletor, 1995). The present study aimed at investigating the behavior of oyster mushroom strain under different media, temperature, and pH requirements for mycelial growth.

Materials and Methods

The mushroom was collected from the premise of college, and cultured on PDA (Potato Dextrose Agar) and PDB (Potato Dextrose Broth) under aseptic conditions and maintained at $25 \pm 1^{\circ} \text{C}$. The strain is isolated and the species of the mushroom is identified by using DNA sequencing method.

Growth study

For the determination of radial growth rate the culture of *Pleurotus ostreatus* were maintained in PDA medium. The radius of the culture was measured for alternate days from 5th to 23rd days of incubation. The radius of the growth was assessed from the center to the contours of the colony by using a measuring scale.

Dark Culture

Production of basidiocarps in different media, viz. Potato Dextrose Agar (PDA), Mushroom Complete Agar (MCA) and Czapek Dox Agar (CDA) was studied. The mycelium of *P. ostreatus* grown on petri plates containing PDA medium, were inoculated in the above mentioned media in 100 ml Erlenmeyer flasks. The flasks were incubated under continuous light and dark at 25°C. All the treatments were carried out in triplicates. Basidiocarps were produced in PDA media, under incubation temperature of 25°C and in complete darkness for 30 days after inoculation. Basidiocarp productions were identified by visual observation.

Results and Discussion

Mycelia Morphology and Growth study

The main characteristics of mycelia morphology as texture (cottony), density (regular), color (off-white) and growth (regular) were identified by visual observation after the complete colonization of the Petri plate in PDA medium. The present report was found to be coinciding with report of Valencia del Toro *et.al* (2014). For the determination of radial growth rate the culture of *Pleurotus ostreatus* were maintained in PDA medium. The radius of the culture was measured for alternate days from 5th to 23rd days of incubation. The radial growth rates were calculated using One Sample T test and applied to verify whether there is a significant difference among daily fungal growth rates on petri dishes filled with PDA media. Differences between means at 5% ($P < 0.05$) level were considered significant.

Plate1: Growth rate of *Pleurotus ostreatus*5th day7th day9th day11th day13th day15th day17th day19th day21st day23rd day

Dark Culture

Many species, which were kept in total darkness, produced abnormal fruit-bodies along with normal ones. In all the cases only a light regime of suitable duration and intensity at a particular stage of development allows normal morphogenesis (K. Narayanan *et al.*, 2002). In the present study it was found that under continuous dark treatment for 21-23 days after inoculation, the mycelial growth of *Pleurotus ostreatus* in PDA medium (Plate-1) produced basidiocarps whereas in MCA medium, the mycelial growth was excellent (27-30 days) and in CDA medium produced only the primordia (27-30 days). The mycelial biomass was recorded.

(Table-1) & (Figure-1).



Basidiocarp formation of pleurotus species in darkness using different media (Figure-1)

Table-1

| Medium | No. of days | Formation of mature basidiocarp (fruit-body) | Biomass(g) |
|------------------------|-------------|--|------------|
| Potato Dextrose Agar | 21-23 | Fruit body appeared | 3.51 |
| Mushroom Complete Agar | 27-30 | Excellent mycelial growth covered the flask | 2.84 |
| Czapek Dox Agar | 27-30 | Only primordia produced | 1.1 |

Conclusion

The radius of the growth was assessed in *Pleurotus* species. The effect of different culture media on mycelia growth of *Pleurotus* species have been recorded. The maximum biomass was recorded on Mushroom Complete media in *P.ostreatus* (2.84g). The minimum biomass was recorded on Czapek Dox media in *P.ostreatus* (1.1g). *Pleurotus* spp. performed best when grown at temperature of 25°C for the fastest mycelial growth. As for as different growing media are concerned MCA media proved to be the best media for the growth of *Pleurotus* spp. pH level must be maintained at 6.5 for best growth of *Pleurotus* spp.

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