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SUITABILITY OF DIFFERENT CULTURE MEDIA FOR MYCELIAL GROWTH OF OYSTER MUSHROOM (*Pleurotus ostreatus*) (Jacq. Fr.) P. Kumm.

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ABSTRACT

The present study was undertaken to observe the different culture media for mycelia growth of oyster mushroom (*Pleurotus ostreatus)* for its suitability. Mushroom culture growth was observed on three different media viz. Wheat extract agar medium, Yeast extract agar medium and Potato Dextrose Agar medium (PDA) and results showed that growth was faster on wheat extract agar medium i.e. 9 days to completely covered on a petri plate of 9 cm diameter when compared with PDA and Yeast agar medium which took 10 & 11 days respectively. This investigation will help to researchers, scientists for selection of suitable culture medium for culture, sub-culture and maintenance of mushroom culture of oyster mushroom (*Pleurotus ostreatus).*

KEYWORDS: Culture Media, Mycelial Growth and *Pleurotus ostreatus*

Oyster mushroom is commonly called as *Dhingri* in India because of its oyster like shape. Genus *Pleurotus* belongs to family *Pleurotaceae* and has about 40 well recognized species, out of which 12 species are cultivated in different parts of country. *Pleurotus* is an efficient lignin-degrading mushroom and can grow well on different type of lingo cellulosic material. Different species, of *Pleurotus* can grow well in variable temperature conditions hence they are ideally suited for cultivation throughout the year in various regions of tropical country like India. Among all cultivated mushroom genera, *Pleurotus* comprises the largest number of species and varieties. Most of them grow best at less than 20^0 C and some others prefer temperatures between 24^0 and 30^0 C. So cultivation of oyster mushrooms can be done round the year, and variation in shape, colour, texture and aroma can be achieved in dependence of the particular species/variant.

All the varieties and species of oyster mushrooms are edible except *P. olearius and P. nidiformis*, which were reported to be poisonous. There are 38 species of the genus recorded throughout the world (Singer 1986). In recent years, 25 species have been commercially cultivated in different parts of the world, among which the most important are as follows: *P. ostreatus, P. flabellatus, P. florida, P. sajor-caju, P. sapidus,, P. cystidiosus, P. eryngii, P. fossulatus, P. opuntiae, P. cornucopiae, P. yuccae, P. platypus, P. djamore, P. tuber-regium, P. australis, P. purpureoolivaceus, P. populinus, P. levis, P. Columbines P. membra-naceus.* The species of *Pleurotus* has ability to excrete hydrolyzing and oxidizing enzymes (Toyama and Ogawa, 1974 and Daugulis& Bone, 1977) which enables them to grow and flourish over wide range of natural lingo-celluloid waste materials.

Mushroom mycelial growth on different growth media and under different culture conditions was investigated in 7 strains of edible fungi. Mycelial growth rates were higher on WDA (wheat/dextrose/agar) medium than on PDA (potato/dextrose/agar) or MPA (malt/Soya peptone agar) media in all strains investigated. Most of the strains had higher growth rates at 30^0 C than at 20 or 25^0 C. *L. edodes* maintained high growth rates at low pH (pH 4.0), and *S. rugoso-annulala* and *P. ostreatus* had high growth rates at pH 5.0. (Furlan *et al.,* (1997). Two species of *P. sajor-caju* and *P. flabellatus* were studies with regard to mycelia growth on three different media. Both these species gave higher mycelia growth rate of 30°C temperature and pH 6 on all the three substrate media. (Ram and Pant (2001). The effect of different levels of lime and pH on mycelial growth and production efficiency of oyster mushroom and concluded that use of 2% lime is good for the production of Oyster mushroom using cotton waste as a substrate. The oyster mushroom grows well and gives best yield at pH slightly basic in nature. (Khan *et al.,* (2013).

MATERIALS AND METHODS

Mushroom Culture

The fresh fruit body of oyster mushroom (*Pleurotus ostreatus*) *(Jacq. Fr.*) P. Kumm. was collected from growing room of mushroom spawn laboratory, BHU. This collected fruit body was used for preparation of mushroom culture and sub-cultured and maintained on

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PDA medium at 26°C temperature in BOD incubator for further investigation.

Preparation of Culture Medium

Potato Dextrose Agar Medium

Ingredients

Peeled Potato	-	250 g
Dextrose	-	20 g
Agar-Agar	-	20 g
Distilled water	-	1 Litre

Procedure

Peeled and sliced potatoes were boiled in water for 20-25 minutes till these become soft. Filtered of the extract with a muslin cloth .20 g dextrose and 20 g agar powder were added to the filtrate over a hot plate by stirring. The final volume of the medium was adjusted to 1 lit by adding required amount of distilled water. The medium was taken in culture tube and conical flasks were plugged with non-absorbent cotton. Prepared medium was sterilized in autoclave at 121°C (15 lb/sq inch pressure) for 20-30 minutes. The autoclaved culture tubes were kept in a slanting position for solidification and medium of conical flask was used for pouring in petri plates.

Wheat Extract Agar Medium

Ingredients

Wheat grain	100 g
Dextrose	20 g
Agar-agar	20 g
Distilled water	1 lit

Procedure

Wheat grains were boiled in 1 litre of distilled water for 1 hr. Extract was filtered through muslin cloth. Agar was added to the supernatant by stirring with a glass rod over a hot plate. The final volume of medium was adjusted to 1 litre by adding required amount of distilled water. The medium was taken in conical flask and sterilized by autoclaving.

Yeast Extract Potato Dextrose Agar Medium (YPDA)

Ingredients

Yeast extract	1.0 g
Peeled potato	250 g
Dextrose	20 g
Agar-agar	20 g
Distilled water	1 litre

Preparation method was same as like potato dextrose agar medium.

Observation of Mycelial Growth of *Pleurotus ostreatus*

Three culture medium viz. Potato dextrose agar, Wheat extract agar, Yeast extract potato dextrose agar were used for evaluating suitability of medium for mycelial growth of *Pleurotus ostreatus* and observations were recorded daily in cm. 20 ml of each sterilized medium were poured in to sterilized petri plates (9cm diameter) and three replications were maintained for each medium. Poured petri plates with cooled and solidified medium were inoculated with a plug of inoculum measuring 5mm in diameter taken from 10 days old culture of *Pleurotus ostreatus*. Inoculated plates were incubated at 26 +/- ^{0}C temperature in B.O.D incubator. Mycelial growth of *Pleurotus ostreatus* was measured daily (in cm diameter) after 24 hours upto full growth in petri plates.

Preparation of Mushroom Culture

Requirements

- Fresh fruiting body of mushroom
- Mercuric chloride solution (0.1%)
- Sterilized distilled water
- Inoculation needle
- Sharp razor
- Spirit lamp
- Sterilized PDA in Petri plate and slant culture tube

Procedure

- Fresh fruit body of oyster mushroom (*Pleurotus ostreatus*) was collected from growing room of mushroom spawn laboratory (B.H.U).
- Collected fruit body was washed with running water to remove dust/soil particles adhering to its surface.
- The outer layer of the fruit body was removed with razor and take out fresh tissue from the inner tissue of the fruit body. Cut the inner portion into small pieces (2-4 mm).

- Small pieces were sterilized with 0.1% mercuric chloride by dipping them in the sol. for few seconds.
- Washed the cut pieces in sterilized distilled water taken in 3 sterilized watch glasses by transferring the cut pieces. These cut pieces were aseptically washed from the one wash to the second and finally to the third one.
- These cut pieces were transferred into PDA slants in culture tube and in petri plates.
- Inoculated culture tube and petri plates were inoculated at 26^{o}C for attainment of growth of mushroom mycelium

RESULTS AND DISCUSSION

In this experiment three different culture media viz. wheat extract medium, Potato Dextrose Agar, yeast extract medium were evaluated for mycelial growth of *Pleurotus ostreatus*. Data recorded was presented in the table,1 and figure,1 indicates the mycelial growth of *Pleurotus ostreatus.*

Table 1: Suitability of different culture media for mycelial growth of oyster mushroom (*Pleurotus ostreatus*) (Jacq. Fr.) P. Kumm.

No. of days	Mycelial growth on different culture media		
	Wheat extract media	PDA (potato dextrose media)	Yeast Extract media
DAY 1	0	0	0
DAY 2	0.6	0.4	0.4
DAY 3	1.5	1.2	0.9
DAY 4	3.7	2.5	1.6
DAY 5	4.4	3.6	2.0
DAY 6	5.6	4.8	3.2
DAY 7	7.3	6.3	4.4
DAY 8	8.4	7.5	5.8
DAY 9	9	8.6	7.5
DAY 10		9	8.4
DAY 11			9

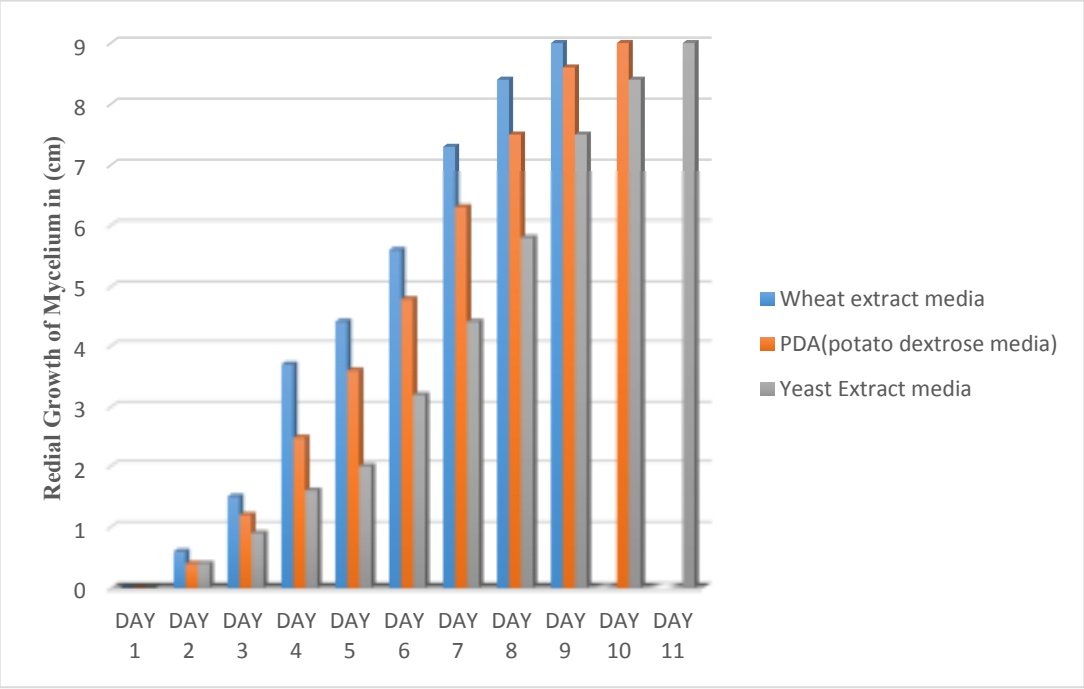

Figure 1: Effect of different culture media on mycelial growth of *Pleurotus ostreatus*

From the above conducted experiment of comparison of radial growth of mushroom culture on different culture media. The result showed that growth of mushroom culture was faster on wheat extract agar medium which 9 days to completely covered on entire surface of medium in petriplate of 9cm diameter when compared with potato dextrose agar medium and yeast extract agar medium which took 10 & 11 days respectively. The result in accordance with finding of Furlan *et al.* (1997) observed mycelial growth of 7 strains of edible fungi on different

culture media. Mycelial growth rates were found higher on WDA (wheat/dextrose/agar) medium than on PDA (potato/dextrose/agar) or MPA (malt/soya peptone/agar) media in all strains investigated. This investigation will help to researchers, scientists for selection of suitable culture medium for culture, sub-culture and maintenance of mushroom culture of oyster mushroom (*Pleurotus ostreatus).*

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